United States
Department of
Agriculture

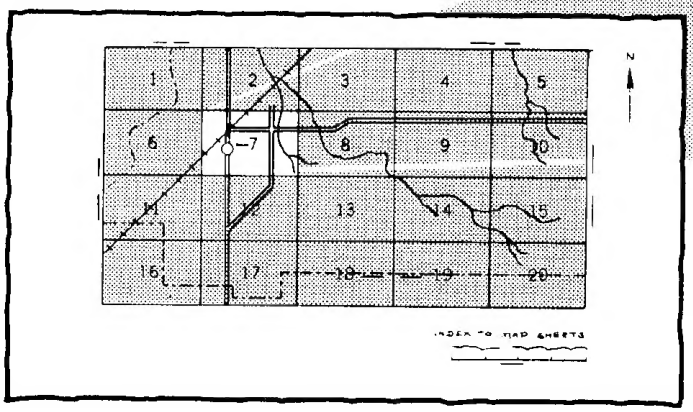
Soil
Conservation
Service

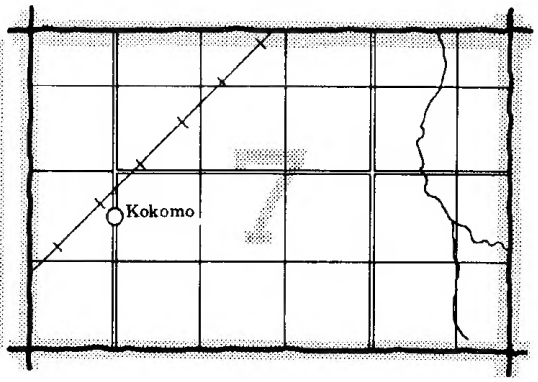
In cooperation with
Virginia Polytechnic
Institute and
State University

Soil Survey of Spotsylvania County Virginia

HOW TO USE

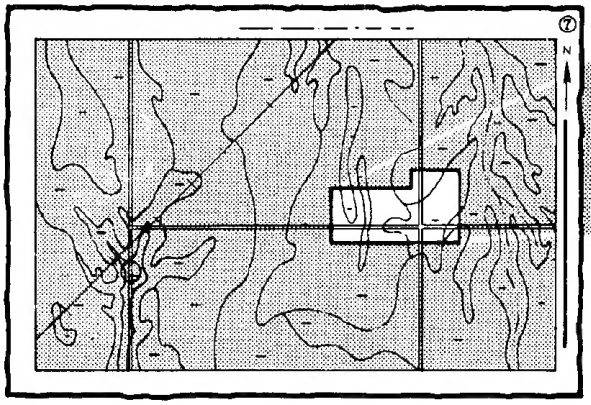
1. Locate your area of interest on the "Index to Map Sheets."

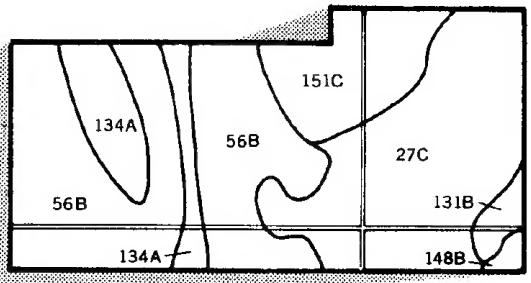




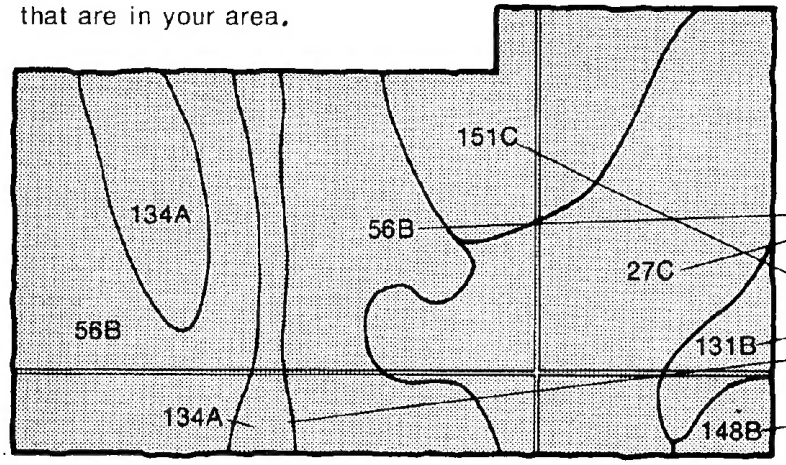
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.





4. List the map unit symbols that are in your area.

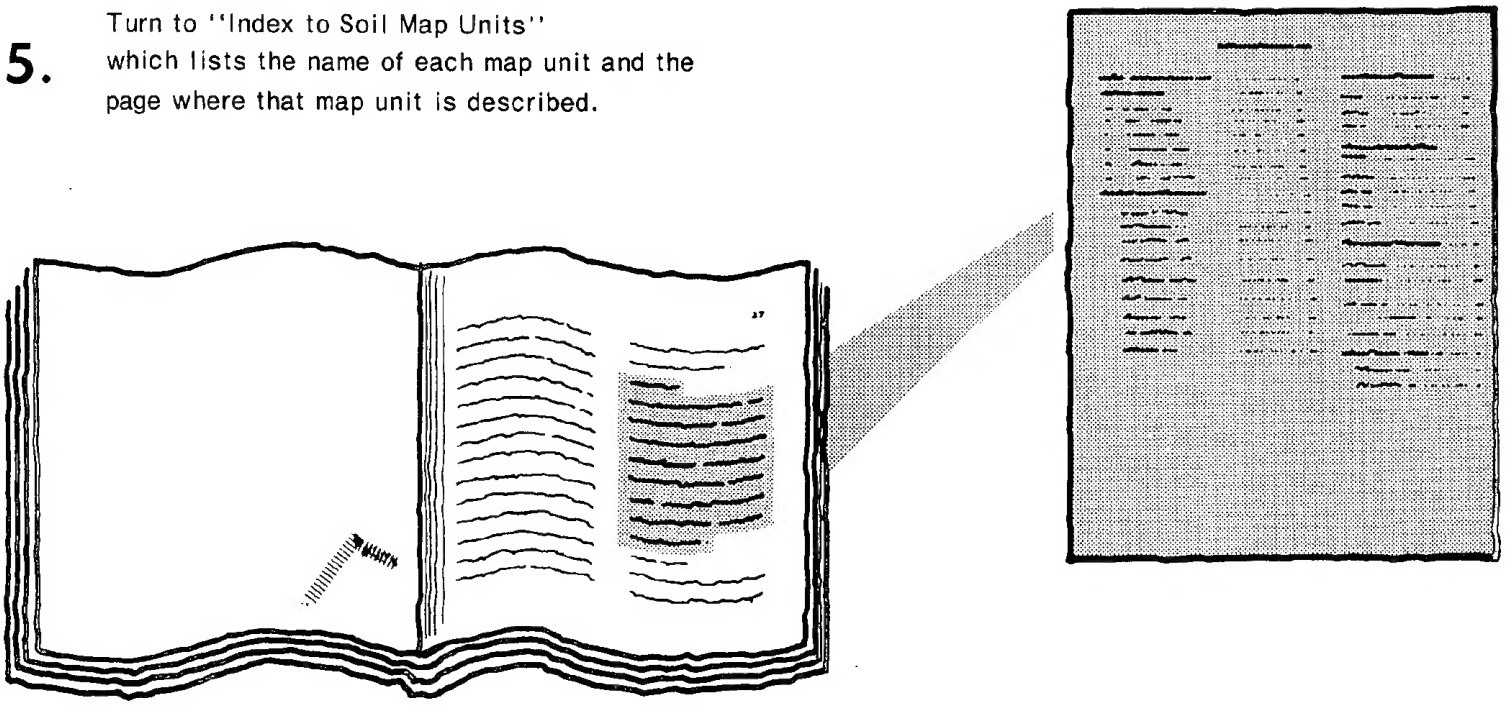


Symbols

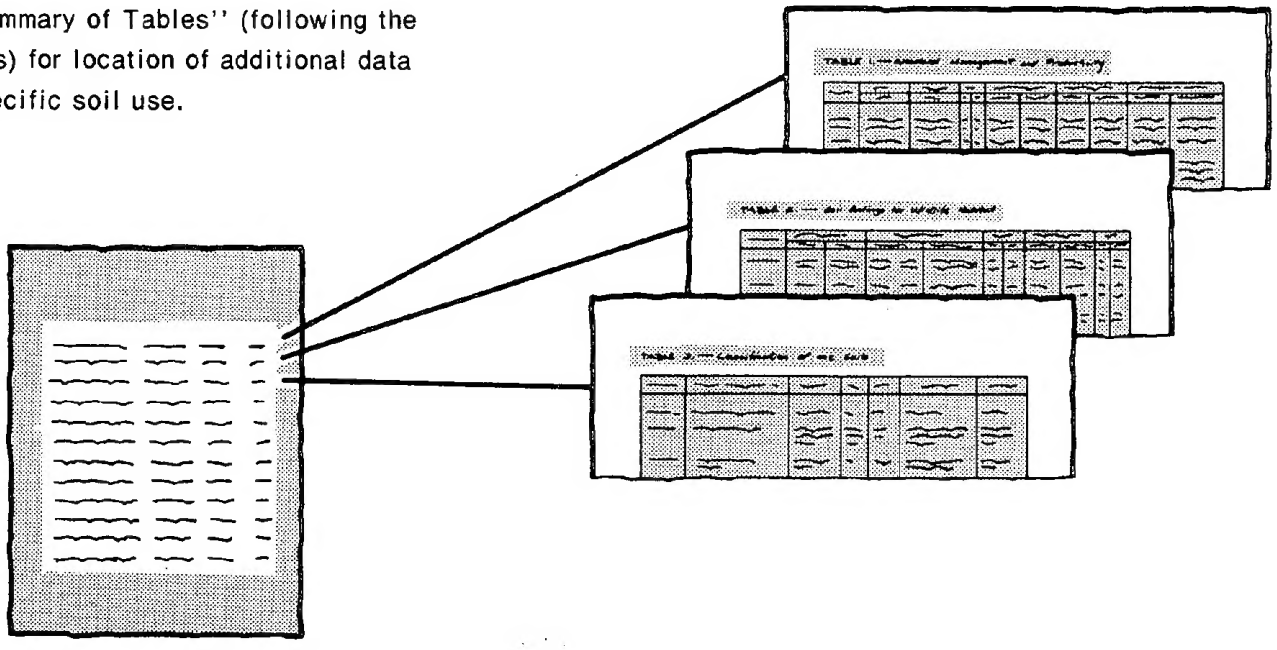
27C
56B
131B
134A
148B
151C

THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1977. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1978. This survey was made by the Soil Conservation Service in cooperation with the Virginia Polytechnic Institute and State University. It is part of the technical assistance furnished to the Tri-County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: The Spotsylvania Court House was built in 1832 in an area of Spotsylvania silt loam, 2 to 7 percent slopes. This historic building was partly destroyed during the Civil War and was later restored.

Contents

Soil Series

Issued August 1985

Index to Map Units

Summary of Tables

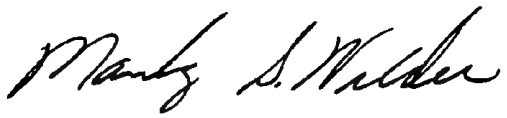
Foreword

This soil survey contains information that can be used in land-planning programs in Spotsylvania County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

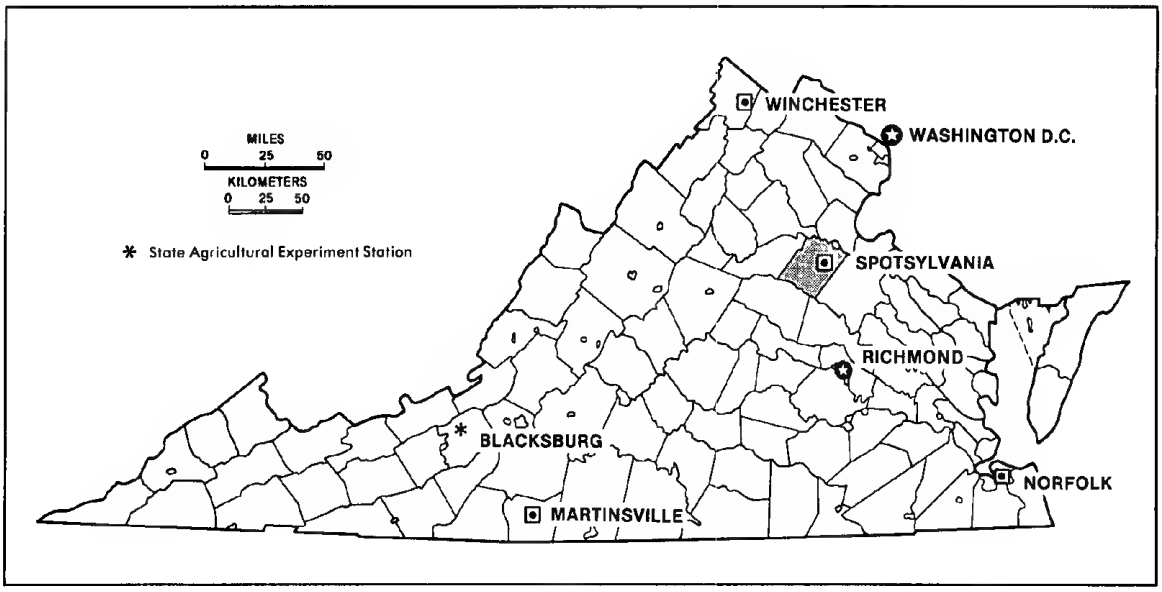
This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.



Manly S. Wilder
State Conservationist
Soil Conservation Service



Location of Spotsylvania County in Virginia.

Soil Survey of Spotsylvania County, Virginia

By John H. Elder, Jr., Virginia Polytechnic Institute and State University

Fieldwork by John H. Elder, Jr., Robert L. Hodges, Richard W. Roads, and Thomas W. Simpson, Virginia Polytechnic Institute and State University

United States Department of Agriculture, Soil Conservation Service
In cooperation with Virginia Polytechnic Institute and State University

SPOTSYLVANIA COUNTY is approximately halfway between Washington, D.C., and Richmond, Virginia, and covers an area of 263,040 acres, or about 411 square miles. It borders Stafford and Culpeper Counties on the north, along the Rappahannock and Rapidan Rivers; Caroline County on the east; Hanover and Louisa Counties on the south, along the North Anna River; and Orange County on the west.

General Nature of the County

This section provides information about Spotsylvania County. It discusses history, climate, physiography, relief, and drainage, and transportation.

History

Spotsylvania County was established in 1720 and was named for Alexander Spottswood, a colonial governor of Virginia. The area was once part of a vast territory that extended far beyond the Blue Ridge Mountains and was called the Gateway to the West. Settlers were already established in the area early in the 17th century. Fort Smith, on the Rappahannock River, was built in 1674.

Spotsylvania is the county seat. Fredericksburg is the largest nearby city; it has a population of more than 16,000 and is the local center of commerce.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Summers in Spotsylvania County are hot, and winters are rather cold. Precipitation is well distributed throughout the year and normally is adequate for all crops. Precipitation in winter is mainly snow, but the ground usually does not stay covered for more than a few days at a time.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Partlow in the period 1952 to 1976. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 36 degrees F, and the average daily minimum temperature is 23 degrees. The lowest temperature on record, which occurred at Partlow on January 18, 1957, is -16 degrees. In summer the average temperature is 74 degrees, and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred at Partlow on August 31, 1953, is 106 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 45.5 inches. Of this, 25 inches, or 54 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18 inches. The heaviest 1-day rainfall during the period of record was 5.45 inches at Partlow on August 12, 1955. Thunderstorms occur on about 40 days each year, and most occur in summer.

The average seasonal snowfall is 18 inches. The greatest snow depth at any one time during the period of

Figure 1.—A typical Coastal Plain landscape. Goldsboro sandy loam is in the foreground, and Faceville loam, 2 to 7 percent slopes, is in the background.

record was 4 inches. On an average of 3 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 9 miles per hour, in spring.

Physiography, Relief, and Drainage

About 65 percent of Spotsylvania County is in the Piedmont physiographic province, and about 35 percent is on the Coastal Plain. The fall line divides the county, and the elevation ranges from more than 540 feet, near the western edge of the county, to sea level or near sea level, along the Rappahannock River in the eastern part.

Bedrock of the Piedmont area is dominantly granite, granite gneiss, hornblende gneiss, and schist of the Paleozoic and Precambrian ages. There are small intrusive dikes of diabase and gabbro of the Triassic age in the Piedmont area.

The Coastal Plain consists mainly of the Sunderland and Brandywine terraces at the higher elevations and smaller terraces in the lower river valleys.

Some of the major streams have cut into the underlying Patuxent and Aquia Formations and may have cut into the St. Mary's Formation.

There are small areas of recent alluvium of Piedmont and Blue Ridge origin along the larger streams and rivers. Most of these flood plains and river terraces are along the Rappahannock River.

The Piedmont areas are sloping and moderately steep and are characterized by narrow to moderately broad ridges and gently sloping to very steep side slopes. The Coastal Plain areas are gently sloping and sloping and are characterized by moderately broad ridges (fig. 1) and gently sloping to moderately steep side slopes.

The Rappahannock and Rapidan Rivers drain the northern part of the county, and the North Anna River drains the southern part. An intricate pattern of smaller streams, including the Mat, Ta, Po, Ni, and Matta Rivers, drains the central part of the county. The major streams flow toward the southeast. The drainageways are well entrenched and have a dendritic pattern.

Transportation

Spotsylvania County has a network of improved roads throughout the county. There are approximately 16 miles of interstate highway, 70 miles of primary roads, and 425 miles of secondary roads.

The Richmond, Fredericksburg, and Potomac Railroad passes through the eastern part of the county and provides passenger and freight service.

The nearest airports—about 50 miles away—that offer regularly scheduled commercial passenger service are in Richmond and in the Washington, D.C., metropolitan area.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit, or association, on the general soil map is a unique natural landscape. Typically, a map unit or association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in other associations but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Some of the boundaries on the general soil map of Spotsylvania County do not match those on the soil maps of adjacent counties, and some of the soil names and descriptions do not fully agree. The differences are a result of improvements in the classification of soils, particularly modification or refinements in soil series concepts. Also, there may be differences in the intensity of mapping or in the extent of the soils within the survey area.

Soil Descriptions

1. Aquults-Wickham-Altavista Association

Deep, poorly drained, well drained, and moderately well drained soils that have a dominantly loamy or clayey subsoil; on stream terraces and Coastal Plain terraces

This association consists of nearly level upland flats separated by broad low ridges. The soils are dominantly nearly level, but on the ridges and side slopes they are gently sloping. Those in a few narrow areas along streams and drainageways are sloping to steep.

This association makes up about 7 percent of the county. It is about 41 percent Aquults, 15 percent Wickham soils, 9 percent Altavista soils, and 35 percent minor soils.

The Aquults are on nearly level upland flats and low ridgetops. They are poorly drained. Wickham soils are mainly on gently sloping ridges and side slopes. In some areas, however, they are on nearly level upland flats and low ridgetops. They are well drained. Altavista soils are on gently sloping ridges and side slopes and are moderately well drained.

The soils of minor extent are Goldsboro and Suffolk soils and Fluvaquents, Udifluvents, and Udorthents. Goldsboro soils are moderately well drained and are on upland flats and in broad interstream areas. Suffolk soils are well drained and are on ridgetops and side slopes. Fluvaquents and Udifluvents are poorly drained to well drained and are along streams and drainageways. Udorthents are well drained and are on side slopes along well-defined waterways.

The soils in this association are used mainly as cropland. A large acreage, at the lower elevations, is wooded.

2. Dystrochrepts-Kempsville-Udults Association

Deep, somewhat excessively drained, well drained, and moderately well drained soils that have a dominantly loamy or clayey subsoil; on Coastal Plain uplands

This association consists of ridges, side slopes, small streams, valleys, and terrace breaks along the larger streams. The soils on the ridges are gently sloping to strongly sloping. The soils on side slopes and terrace breaks are sloping to steep, and those along the small stream valleys are steep to very steep.

This association makes up about 6 percent of the county. It is about 21 percent Dystrochrepts, 19 percent Kempsville soils, 16 percent Udults, and 44 percent minor soils.

Dystrochrepts and Udults are on ridges, on the steeper side slopes, on terrace breaks, and in small stream valleys. These soils are in intermingled areas; consequently, they are mapped as a complex. Dystrochrepts and Udults are somewhat excessively drained to moderately well drained. In most areas, however, these soils are somewhat excessively drained or well drained. They have a loamy or clayey subsoil.

Kempsville soils are on ridges and side slopes. They are well drained. Kempsville soils have a loamy subsoil that is brittle in some places.

The soils of minor extent are Dogue, Emporia, Goldsboro, and Savannah soils and Aquults, Udifluvents, and Udorthents. Emporia soils are well drained and are on ridges and side slopes. Dogue and Goldsboro soils are moderately well drained. Dogue soils are on low

terraces along the larger streams. Goldsboro soils are on toe slopes and at the head of drainageways. Savannah soils are moderately well drained and are on ridges, side slopes, and along drainageways. Aquults are poorly drained and somewhat poorly drained. They are mostly in low areas on stream terraces, in depressions, and on toe slopes. Udifluvents and Udorthents are well drained or moderately well drained. They are on flood plains along streams and large drainageways.

The soils in this association are used mainly as woodland. Some areas are in pasture, and a few areas are used as cropland. Some areas are used for urban development.

3. Savannah-Faceville-Varina Association

Deep, moderately well drained and well drained soils that have a fragipan or a dominantly clayey subsoil; on Coastal Plain uplands

This association consists of gently rolling and rolling side slopes and broad ridges. The soils on the ridges are nearly level to gently sloping. The soils on some side slopes along the larger streams and along drainageways are sloping to very steep.

This association makes up about 10 percent of the county. It is about 29 percent Savannah soils, 18 percent Faceville soils, 8 percent Varina soils, and 45 percent minor soils.

Savannah soils are mainly on the broad ridges and gentle side slopes. They are moderately well drained. Savannah soils have a loamy subsoil and a fragipan. Faceville and Varina soils are on ridgetops and side slopes. In many places Faceville soils and Varina soils are intermingled. Faceville and Varina soils are well drained and have a clayey subsoil.

The soils of minor extent are Bama, Goldsboro, and Masada soils and Aquults, Fluvaquents, Udifluvents, and Udorthents. Bama and Masada soils are well drained and are on ridgetops and side slopes. Goldsboro soils are moderately well drained and are on toe slopes, at the head of drainageways, and in low areas. Aquults are poorly drained and somewhat poorly drained soils. They are in depressions, in swales, and on toe slopes and are nearly level or gently sloping. Fluvaquents and Udifluvents are poorly drained to well drained. They are on flood plains along streams and drainageways and are nearly level. Udorthents are moderately well drained to somewhat excessively drained. They are along drainageways in developed areas and in areas where sand and gravel have been mined. Udorthents are mostly sloping to moderately steep, but they range from nearly level to very steep.

Much of the acreage in this association is used as cropland or pasture. A large acreage is used as woodland, and some is used for urban development.

4. Appling-Wedowee-Emporia Association

Deep, well drained soils that have a dominantly clayey or loamy subsoil; on Piedmont and Coastal Plain uplands

This association consists of undulating to hilly, narrow to broad ridges and side slopes. There are some well-defined stream valleys. The soils on the broad ridges are gently sloping. Those on the narrow ridges and the side slopes are sloping to moderately steep. The soils on the valley sides are steep and, in some small areas, very steep. Some nearly level soils are on narrow flood plains along the larger streams.

This association makes up about 19 percent of the county. It is about 24 percent Appling soils, 20 percent Wedowee soils, 10 percent Emporia soils, and 46 percent minor soils.

Appling soils are on the broad ridges and the gentler side slopes. Appling soils and Wedowee soils are intermingled in many areas on the narrow ridges and the steeper side slopes and near slope breaks and on the points of ridges. Emporia soils are on long winding ridgetops and on side slopes. They are on the Coastal Plain along the irregular edge of the Piedmont region.

Appling and Wedowee soils are well drained and have a clayey subsoil. Emporia soils are well drained and have a loamy subsoil.

The soils of minor extent are Abell, LaRoque, Partlow, Savannah, and Turbeville soils and Fluvaquents and Udifluvents. Abell and Savannah soils are moderately well drained. Abell soils are in depressions and along small drainageways on toe slopes. Savannah soils are on ridgetops and side slopes; they have a fragipan. LaRoque and Turbeville soils are well drained and are on ridgetops and side slopes in the Piedmont region. Partlow soils are poorly drained and are in depressions, on toe slopes, and along drainageways. Fluvaquents and Udifluvents are poorly drained to well drained. They are on flood plains throughout the association.

Most of the acreage in this association is used as woodland. Some of the acreage is used as cropland, and some is used for pasture.

5. Appling-Louisburg-Wedowee Association

Deep and moderately deep, well drained soils that have a dominantly clayey or loamy subsoil; on Piedmont uplands

This association consists of undulating to very steep, narrow to broad winding ridges, side slopes, and steep slope breaks. There are narrow, nearly level flood plains along most streams. The soils on the ridges are mainly gently sloping, and on the side slopes they are mainly sloping. Along some of the larger streams in well-defined valleys, the soils on the valley sides are moderately steep, and in a few small areas, they are very steep.

This association makes up about 24 percent of the county. It is about 27 percent Appling soils, 15 percent

Louisburg soils, 10 percent Wedowee soils, and 48 percent minor soils.

Appling soils are on the broad ridges and on side slopes. Wedowee soils are on the points of ridges and near slope breaks. Appling soils and Wedowee soils are intermingled in many areas on the narrow ridges and on the upper edge of side slopes. Louisburg soils are on narrow ridges and steep side slopes.

Appling and Wedowee soils are deep and well drained and have a clayey subsoil. Louisburg soils are moderately deep. They are well drained and have a loamy subsoil.

The soils of minor extent are Abell, Colfax, LaRoque, Spotsylvania, and Toddstav soils and Aquults, Fluvaquents, and Udifluvents. Abell soils are moderately well drained and are along drainageways, on toe slopes, and in depressions. Colfax soils are somewhat poorly drained and are in saddles, in upland depressions, at the head of and along small drainageways, and on toe slopes. LaRoque and Spotsylvania soils are well drained and are on ridgetops and side slopes. Toddstav soils are poorly drained and Aquults are somewhat poorly drained and poorly drained. They are in depressions, on toe slopes, and along drainageways. Fluvaquents and Udifluvents are poorly drained to well drained and are on flood plains scattered throughout the association.

Most of the acreage in this association is used as woodland. Some of the acreage is used as cropland, and some is used for pasture.

6. Nason-Tatum-Catharpin Association

Deep, well drained soils that have a dominantly clayey subsoil; on Piedmont uplands

This association consists of undulating to hilly side slopes and broad ridgetops. There are narrow, nearly level flood plains along most of the streams. The soils on the ridges are mainly gently sloping, and on the side slopes they are mainly sloping. The soils on the side slopes near the larger streams and along drainageways are moderately steep.

This association makes up about 27 percent of the county. It is about 27 percent Nason soils, 17 percent Tatum soils, 10 percent Catharpin soils, and 46 percent minor soils.

Nason and Tatum soils are mostly on the narrower ridges and moderate side slopes, but they are also on broad ridges and steeper side slopes. Catharpin soils are on broad ridgetops. Nason, Tatum, and Catharpin soils are well drained and have a clayey subsoil. The upper part of the Catharpin soils formed in a mantle of silt and clay sediment containing quartzite pebbles.

The soils of minor extent are the Brockroad, LaRoque, Margo, Partlow, and Toddstav soils and Fluvaquents and Udifluvents. Brockroad and LaRoque soils are well drained. Brockroad soils are deep and are on broad ridgetops. LaRoque soils are moderately deep and are mostly on the steeper side slopes. Margo soils are moderately well drained and are on toe slopes, in depressions, and along drainageways. Partlow and Toddstav soils are poorly drained and are in depressions, on toe slopes, and along drainageways. Fluvaquents and Udifluvents are poorly drained to well drained and are on flood plains scattered throughout the association.

Most of the acreage of this association is used as woodland. Some acreage is used for cultivated crops, and some is in brushy pasture.

7. Fluvanna-Appling-Poindexter Association

Deep and moderately deep, well drained soils that have a dominantly clayey or loamy subsoil; on Piedmont uplands

This association consists of undulating to very steep, narrow to moderately broad ridges, side slopes, and slope breaks. The soils on the ridgetops and side slopes are gently sloping to sloping. The soils on slope breaks are mainly steep. Some nearly level soils are on narrow flood plains along the larger streams.

This association makes up about 7 percent of the county. It is about 50 percent Fluvanna soils, 11 percent Appling soils, 10 percent Poindexter soils, and 29 percent minor soils.

Fluvanna soils are mainly on side slopes. In some areas, however, they are on ridgetops. Appling soils are on ridges and side slopes. Appling soils and Wedowee soils are intermingled in areas on the steeper side slopes. Poindexter soils are mostly on the steeper side slopes and on narrow slope breaks. Fluvanna and Appling soils are deep. They are well drained and have a clayey subsoil. Poindexter soils are moderately deep. They are well drained and have a loamy subsoil.

The soils of minor extent are Abell, Brockroad, Cartecay, Colfax, Partlow, and Toddstav soils and Fluvaquents and Udifluvents. Abell soils are moderately well drained and are on toe slopes, along small drainageways, and in depressions. Brockroad soils are well drained and are on broad ridgetops. Cartecay soils are somewhat poorly drained, Fluvaquents are poorly drained or somewhat poorly drained, and Udifluvents are moderately well drained or well drained. These soils are on flood plains scattered throughout the association. Colfax soils are somewhat poorly drained and have a fragipan. They are in depressions, on toe slopes, at the head of small drainageways, and along small drainageways. Partlow and Toddstav soils are poorly drained and are in depressions along drainageways and on toe slopes.

Most of the acreage in the association is used as woodland. Some areas are used as cropland or pasture.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Cecil loam, 2 to 7 percent slopes, is one of several phases in the Cecil series.

Some map units are made up of two or more major soils. These map units are called soil complexes.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Cecil-Pacolet complex, 7 to 15 percent slopes, eroded, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

1B—Abell sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, moderately well drained soil along drainageways, on toe slopes, and in upland depressions. Some areas are cut by small drainageways. Slopes commonly are slightly concave and are about 200 to 500 feet long. The areas of this soil range from 2 to about 15 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 2 inches thick. The subsurface layer is pale brown sandy loam about 10 inches thick. The subsoil is mostly brownish yellow and yellowish brown sandy clay loam about 50 inches thick. It has gray mottles below a depth of about 28 inches. There is a layer of gravel at a depth of 47 inches. The substratum to a depth of 75 inches or more is strong brown and pale brown sandy loam.

Included with this soil in mapping are small areas of well drained Appling and Cecil soils and poorly drained Partlow soils. Appling and Cecil soils are in higher areas than Abell soils. Partlow soils are along drainageways and in depressions. Also included are soils that have a gravelly sandy loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed. A

seasonal high water table is at a depth of 2 to 3 1/2 feet in winter and spring and is at or near the surface during wet periods. Some areas are ponded for very brief periods after heavy rains.

In most areas this soil is used as cropland or woodland. This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. The soil is wet and cold in spring, and wetness often delays tillage. In some places, crops are damaged by high water after heavy rains. Drainage and control of high water help to alleviate wetness and reduce crop damage. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet causes compaction of the surface layer and damages stands of grasses and legumes.

The potential productivity of this soil for trees is high, especially for loblolly pine and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Ponding and the seasonal high water table limit the use of the soil as a site for buildings, sanitary landfills, and septic tank absorption fields. Low strength limits its use for roads.

The capability subclass is IIw.

2B—Altavista sandy loam, 0 to 4 percent slopes. This is a deep, nearly level, moderately well drained soil on broad, slightly concave to slightly convex terraces along the larger streams. The areas of this soil are elongated or irregularly rounded. They range from 2 to about 20 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 1 inch thick. The subsurface layer is brown sandy loam about 10 inches thick. The subsoil is mostly yellowish brown and brownish yellow sandy clay loam about 41 inches thick. There are gray mottles below a depth of about 26 inches. The substratum to a depth of 60 inches or more is mostly gray mottled, brownish yellow gravelly loamy sand.

Included with this soil in mapping are small areas of poorly drained and somewhat poorly drained Aquults and well drained Wickham soils. Aquults are at the head of drainageways and along drainageways. Wickham soils are in slightly higher areas scattered throughout. Also included are areas of gravelly soils and soils that have a compact layer in the subsoil. The included soils make up about 15 to 25 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is very strongly acid throughout except in areas that have been limed. In some areas the soil is flooded occasionally for very brief periods in spring and early in summer. A seasonal high water table is at a depth of 1 1/2 to 2 1/2 feet in winter and early in spring.

In most areas this soil is used as cropland. In some areas it is used as woodland, and in a few areas it is in pasture.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. The soil is wet and cold early in spring, and wetness often delays tillage. In some areas, crops are often damaged by very brief flooding in spring and early in summer. Drainage and control of flooding help alleviate wetness and reduce crop damage. Minimum tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Alfalfa is often short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet causes compaction of the surface layer and damages the stand of grasses and legumes.

The potential productivity of this soil for trees is high, especially for loblolly pine and yellow-poplar. Seeds and seedlings survive and grow well. The use of heavy equipment is restricted during wet periods.

The seasonal high water table and the hazard of flooding limit the use of the soil as sites for buildings, sanitary landfills, or septic tank absorption fields. A suitable base material is necessary to provide strength and stability to the soil if it is used for roads.

The capability subclass is IIw.

3B—Appling sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on convex ridgetops that are about 300 to 800 feet wide. The areas of this soil commonly are long and winding. They range from 2 to about 30 acres in size.

Typically, the surface layer is dark grayish brown and yellowish brown sandy loam about 9 inches thick. The subsoil is mostly strong brown sandy clay loam and clay about 38 inches thick. The substratum is mostly yellowish red, red, white, and brownish yellow sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Abell soils, somewhat poorly drained to moderately well drained Colfax soils, and well drained Louisburg and Spotsylvania soils. Abell soils are

at the head of small drainageways. Colfax soils are in small upland depressions, around the head of drainageways, and along drainageways. Louisburg soils are mainly on the points of ridges and on side slopes. Spotsylvania soils are mainly on the broad flatter ridges. Also included are areas of soils that have a gravelly silt loam surface layer and severely eroded soils that have a yellowish brown sandy clay loam or clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing causes soil compaction and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil.

The low shrink-swell potential limits the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. The moderate permeability of the subsoil limits the use of this soil as septic tank absorption fields.

The capability subclass is IIe.

4C2—Appling-Wedowee sandy loams, 7 to 15 percent slopes, eroded. The soils making up this complex are deep, sloping, and well drained. They are on smooth or convex side slopes. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas are commonly long and winding and range from 2 to 30 acres or more in size. The complex consists of about 50 percent Appling sandy loam, 35 percent Wedowee sandy loam, and 15 percent other soils.

Typically, the surface layer of the Appling soil is yellowish brown sandy loam about 6 inches thick. The subsoil is mainly strong brown clay about 38 inches thick. The substratum to a depth of 60 inches or more is mainly yellowish red, red, white, and brownish yellow sandy loam.

Typically, the surface layer of the Wedowee soil is brownish yellow sandy loam about 6 inches thick. The subsoil is mainly strong brown and yellowish red clay about 27 inches thick. The substratum, to a depth of 60 inches or more, is brownish yellow, strong brown, yellowish red, and white clay loam.

The other soils included in this complex are the somewhat poorly drained to moderately well drained Colfax soils, well drained Louisburg soils, and poorly drained Partlow soils. Colfax soils are at the head of drainageways, along drainageways, and on toe slopes. Louisburg soils are mainly on ridgetops and on the points of ridges. Partlow soils are along drainageways and small streams. Also included are small areas of soils that have a gravelly sandy loam surface layer and small areas of severely eroded soils that have a strong brown sandy clay loam or clay loam surface layer.

Permeability of the soils making up this complex is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The shrink-swell potential of the Appling soil is low, and that of the Wedowee soil is moderate. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils are strongly acid or very strongly acid except in areas that have been limed.

The soils are used mainly as woodland. In some areas they are used as cropland or pasture.

These soils are moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

These soils are well suited to pasture and hay. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer, increases runoff, and increases erosion.

The potential productivity of the soils for trees is moderately high. Loblolly pine, yellow-poplar, and upland oaks are suitable trees. Seeds and seedlings survive and grow well if competing vegetation is controlled.

The slope and low or moderate shrink-swell potential limit the use of the soils as sites for buildings, and the clayey subsoil limits excavation. Low strength is a limitation for roads. Slope and the moderate permeability of the subsoil limit the use of these soils as septic tank absorption fields and recreation areas.

The capability subclass is IIIe.

4D2—Appling-Wedowee sandy loams, 15 to 25 percent slopes, eroded. The soils making up this complex are deep, moderately steep, and well drained. They are on smooth or convex, narrow side slopes that are 300 to 800 feet long. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas are commonly long and winding and range from 2 to 15 acres or more in size. The complex consists of about 40 percent Appling fine sandy loam, 40 percent Wedowee fine sandy loam, and 20 percent other soils.

Typically, the surface layer of the Appling soil is yellowish brown sandy loam about 5 inches thick. The subsoil is mostly strong brown clay, about 38 inches thick. The substratum, to a depth of 60 inches or more, is mostly yellowish red, white, and brownish yellow sandy loam.

Typically, the surface layer of the Wedowee soil is brownish yellow sandy loam about 5 inches thick. The subsoil is mostly strong brown and yellowish red clay about 25 inches thick. The substratum, to a depth of 60 inches or more, is red, brownish yellow, strong brown, yellowish red, and white sandy loam.

The other soils included in this complex are the well drained Louisburg soils and poorly drained Partlow soils. Louisburg soils are scattered throughout the map unit. Partlow soils are along drainageways and small streams. Also included are areas of soils that have a gravelly sandy loam surface layer and small areas of severely eroded soils that have a strong brown sandy clay loam or clay loam surface layer.

Permeability of the soils making up this complex is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable. It can be easily tilled when it is moist, but breaks into clods if tilled when it is too wet or too dry. The shrink-swell potential of the Appling soil is low, and that of the Wedowee soil is moderate. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils are strongly acid or very strongly acid except in areas that have been limed.

The soils are used mainly as woodland. In a few areas they are used as cropland, and in a few areas they are in pasture.

These soils are poorly suited to cultivated crops. Crops respond to lime and fertilizer. Minimum tillage, terraces, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

These soils are moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer, increases runoff, and increases erosion.

The potential productivity of the soils for trees is moderately high, especially for loblolly pine, yellow-poplar, and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope mainly limits the use of the soils as sites for buildings, and the clayey subsoil and slope limit excavations. Slope and low strength limit the use of the soils for roads. Slope limits the use of the soils as septic tank absorption fields and recreation areas.

The capability subclass is IVe.

5—Aquults, clayey subsoil. These are deep, nearly level, poorly drained and somewhat poorly drained soils in broad, slightly concave upland depressions. The areas of these soils are irregularly rounded or oval or are long and narrow and are about 200 to 1,000 feet wide. They range from 2 to more than 30 acres in size.

Typically, the surface layer is gray or grayish brown fine sandy loam or loam about 10 inches thick. The subsoil is mostly gray clay loam that is mottled with brighter colors. The subsoil is about 40 inches thick. The substratum to a depth of 60 inches or more is mostly gray, yellowish brown, and olive gravelly sand to clay.

Included with these soils in mapping are small areas of well drained Faceville soils and moderately well drained Savannah soils. These soils are in small, slightly higher oval or elongated areas scattered throughout the map unit. The included soils make up about 20 percent of the map unit.

Permeability is slow or very slow, and the available water capacity is moderate. Surface runoff is very slow. Erosion is a slight hazard. The surface layer is friable. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils commonly are extremely acid or very strongly acid throughout. In some areas they are ponded for brief periods during winter and spring, after heavy rains, and during prolonged wet periods. In many areas the soils dry slowly in spring and after heavy rains. A seasonal high water table is at or near the surface or within a depth of 1 1/2 feet in winter and spring.

In most areas these soils are used as woodland. In some areas they are drained and are used as cropland.

These soils are poorly suited to cultivated crops because of wetness. If drained, the soils are moderately well suited to cultivated crops. The slow permeability and the clayey subsoil make open ditch drains more suitable than tile drains. In some areas, suitable outlets are difficult to locate. The soils are wet and cold in spring, and wetness may delay tillage. If the soils are not drained, cultivated crops cannot be grown in most years.

These soils are poorly suited to hay and pasture because of wetness. If drained, they are moderately well suited. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, drainage, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soils are wet compacts the surface layer and damages stands of grasses and legumes.

The potential productivity of these soils for trees is high, especially for loblolly pine, sweetgum, red maple, and willow oak. Seeds and seedlings survive and grow well if competing vegetation is controlled. The use of heavy equipment is restricted during wet periods.

The seasonal high water table restricts the use of the soils as sites for sanitary landfills. The slow permeability of the subsoil and the seasonal high water table limit the use of the soils as septic tank absorption fields. Low strength limits their use for roads.

The capability subclass is Vw.

6—Aquults, gravelly substratum. These are deep, nearly level, poorly drained and somewhat poorly drained soils on broad, slightly concave terraces along the larger streams. The areas of these soils are irregularly oval or are long and narrow and are about 150 to 1,200 feet wide. They range from 2 to more than 40 acres in size.

Typically, the surface layer is gray, grayish brown, or brown loam or silt loam about 8 to 10 inches thick. The subsoil is about 40 to 50 inches thick and has gray mottles. It is mostly gray or brown and brownish yellow sandy clay loam, but it ranges to clay. The substratum is mostly gravelly or very gravelly sandy loam, loamy sand, or sand.

Included with these soils in mapping are small areas of moderately well drained Altavista soils and well drained Wickham soils. These soils are in slightly higher, oval or elongated areas scattered throughout the map unit. Also included are small areas of soils that have a gravelly surface layer and soils that have a silt loam subsoil. The included soils make up about 15 percent of the map unit.

Permeability is slow, and the available water capacity is moderate. Surface runoff is very slow. Erosion is a slight hazard. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils commonly are very strongly acid or strongly acid throughout. In some areas the soils are ponded for brief periods during the winter and spring, after heavy rains, and during prolonged wet periods throughout the remainder of the year. The seasonal high water table is between the surface and a depth of 1 1/2 feet in winter and spring.

In most areas these soils are used as woodland. In some areas they are in pasture, and in some areas they are used for gardens.

These soils are poorly suited to cultivated crops and hay. They are poorly suited to pasture unless they are drained and protected from flooding. Overgrazing when the soil is wet compacts the surface layer and damages stands of grasses and legumes.

The potential productivity of these soils for trees is high, especially for sweetgum, loblolly pine, red maple, and willow oak. Seeds and seedlings survive and grow well if competing vegetation is controlled. The use of heavy equipment is restricted during wet periods.

The seasonal high water table and ponding limit the use of the soils as sites for buildings, septic tank absorption fields, and sanitary landfills. They also limit the use of the soils as recreation areas.

The capability subclass is Vw.

7B—Aquults, loamy-Margo complex, 2 to 7 percent slopes. The soils making up this complex are deep and gently sloping. Aquults, loamy, are poorly drained and somewhat poorly drained, and Margo soils are moderately well drained. The soils are on toe slopes, on saddles, at the head of drainageways, and along small streams. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas are long and winding and range from 2 to 20 acres or more in size. The complex consists of about 40 percent Aquults, loamy, 40 percent Margo soils, and 20 percent other soils.

Typically, the surface layer of Aquults, loamy, is gray or brown loam or silt loam about 8 to 10 inches thick. The subsoil is mainly gray or yellowish brown and brown, mottled loamy material. It extends to a depth of 60 inches or more. The substratum commonly is stratified loamy sand to clay that is gravelly or very gravelly in some places.

Typically, the surface layer of Margo soils is light yellowish brown loam about 9 inches thick. The subsoil, which extends to a depth of 45 inches, is mainly yellowish brown and light olive brown clay loam. The substratum, to a depth of 60 inches or more, is gray mottled, brownish yellow sandy loam.

The other soils included in this complex are the well drained Brockroad, LaRoque, and Tatum soils and the poorly drained Toddstav soils. Brockroad, LaRoque, and Tatum soils are in the more sloping areas. Toddstav soils are in depressions and along waterways. Also included are small areas of very poorly drained soils and soils that have a compact subsoil.

Permeability of the soils making up this complex is moderate, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The surface layer of these soils is friable and can be easily tilled. The shrink-swell potential is moderate. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils are generally strongly acid or very strongly acid throughout. Low areas are flooded briefly after heavy

rains. The soils have a seasonal high water table at a depth of 1 foot to 3 feet during winter and spring.

These soils are moderately well suited to cultivated crops if they are drained. In addition, the soils in the low areas need protection from flooding. The soils are wet and cold in spring, and wetness often delays tillage. If the soils are not drained and are not protected from flooding, crops will be damaged by excess water. Minimum tillage, contour tillage, water-tolerant cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain the organic matter content and tilth, reduce crusting, and increase water infiltration.

These soils are moderately well suited to pasture and hay. Alfalfa is short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, control of excess water, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet causes compaction of the surface layer and damages stands of grasses and legumes.

These soils are used mainly as woodland. Their potential productivity for trees is high. Loblolly pine, willow oak, and yellow-poplar are suitable trees. Seeds and seedlings survive and grow well if competing vegetation is controlled. The use of heavy equipment is restricted during wet periods.

The seasonal high water table and the hazard of flooding limit excavation on these soils, and they limit the use of the soils as sites for buildings, sanitary landfills, and septic tank absorption fields. They also limit these soils for use as recreation areas.

The capability subclass is IVw.

8B—Bama sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on medium to narrow, convex ridgetops. The areas of this soil are long and winding or are somewhat rounded. They range from 2 to more than 20 acres in size.

Typically, the surface layer is brown sandy loam about 10 inches thick. The subsoil is mostly yellowish red sandy clay loam about 50 inches thick. The substratum is multicolored sandy loam.

Included with this soil in mapping are small areas of well drained and moderately well drained Emporia soils, well drained Kempsville soils, and moderately well drained Savannah soils. Emporia and Kempsville soils are scattered throughout the map unit. Savannah soils are on the broader ridges. The included soils make up about 15 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland. Some areas are in brushy pasture.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer, increases runoff, and increases erosion.

The potential productivity of this soil for trees is high, especially for loblolly pine, yellow-poplar, and upland oaks. Seeds and seedlings do well if competing vegetation is controlled.

The permeability of the substratum limits the use of the soil as sites for sewage lagoons and sanitary landfills.

The capability subclass is IIe.

8C—Bama sandy loam, 7 to 15 percent slopes. This is a deep, sloping, well drained soil on medium to narrow side slopes and ridgetops. The areas of this soil are long and narrow or are somewhat rounded. They range from 2 to more than 10 acres in size.

Typically, the surface layer is brown sandy loam about 8 inches thick. The subsoil is mostly yellowish red sandy clay loam about 52 inches thick. The substratum is multicolored sandy loam.

Included with this soil in mapping are small areas of well drained Emporia and Kempsville soils and moderately well drained Savannah soils. Emporia and Kempsville soils are scattered throughout the map unit. Savannah soils are on the broader side slopes. The included soils make up about 15 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Runoff is rapid. Erosion is a severe hazard. The surface layer is friable and can be easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland, and some areas are in pasture.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to

soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer, increases runoff, and increases erosion.

The potential productivity of this soil for trees is high, especially for loblolly pine, yellow-poplar, and upland oaks. Seeds and seedlings grow well if competing vegetation is controlled.

The permeability of the substratum and the slope limit the use of the soil for sewage lagoons and sanitary landfills. Slope limits its use as sites for buildings.

The capability subclass is IIIe.

9B—Brockroad silt loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on broad convex ridgetops. The areas of this soil commonly are irregularly rounded or oval and range from 3 to about 50 acres or more in size.

Typically, the surface layer is dark grayish brown silt loam about 1 inch thick. The subsurface layer is pale brown silt loam about 8 inches thick. The subsoil is mostly yellowish brown and yellowish red clay loam and clay about 66 inches thick. The substratum is mostly red, strong brown, and white weathered rock.

Included with this soil in mapping are small areas of well drained Catharpin and Nason soils and poorly drained Toddstav soils. Toddstav soils are in small upland depressions, around the head of drainageways, and along drainageways. Nason soils are mainly on the lower part of slopes. Catharpin soils are mainly on the crests and points of ridges. Also included are soils that have a gravelly silt loam surface layer and severely eroded soils that have a surface layer of yellowish brown silty clay loam. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer, increases runoff, and increases erosion.

The potential productivity of this soil for trees is moderate. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and upland oaks grow well on this soil.

The moderate shrink-swell potential limits the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. The moderate permeability of the subsoil limits the use of the soil as septic tank absorption fields.

The capability subclass is IIe.

10—Cartecay sandy loam. This is a deep, nearly level, somewhat poorly drained soil on flood plains along streams and large drainageways. The areas of this soil are low lying and commonly are long and narrow. They range from 2 to about 10 acres in size. The slopes range from 0 to 2 percent.

Typically, the surface layer is dark brown sandy loam about 11 inches thick. The substratum to a depth of 52 inches is mostly dark grayish brown and dark yellowish brown sandy loam that has gray mottles. To a depth of 60 inches or more, it is gray and mottled sandy loam.

Included with this soil in mapping are small areas of moderately well drained Abell soils and well drained Toccoa and Wickham soils. Abell and Wickham soils are slightly higher on the landscape than the Cartecay soil; they are near the higher terraces or uplands. Toccoa soils commonly are close to streams. Also included are small areas of sandy soils and soils that have a gravelly sandy loam surface layer. The included soils make up about 15 percent of the map unit.

Permeability is moderately rapid, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The surface layer is friable and can be easily tilled. The substratum has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is medium acid or strongly acid throughout except in areas that have been limed. It frequently is flooded for brief periods from late in the fall to spring (fig. 2). In many areas the soil dries slowly in spring and after heavy rains. A seasonal high water table is at a depth of 1/2 foot to 1 1/2 feet in winter and spring.

In some areas this soil is used as woodland. In some areas it is used as cropland or pasture.

If the soil is drained and protected from flooding, it is well suited to cultivated crops. Crops respond well to lime and fertilizer. The soil is wet and cold in spring, and

Figure 2.—Flooding is frequent in areas of somewhat poorly drained Cartecay sandy loam. Nevertheless, trees that are adapted to wet conditions grow well on this soil.

wetness often delays tillage. If the soil is not protected from flooding, crops will be damaged by brief flooding on an average of once every year. Minimum tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture if it is drained and protected from flooding. Alfalfa is short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, drainage, flood control, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and damages the grasses and legumes.

The potential productivity of this soil for trees is high, especially for loblolly pine, yellow-poplar, and sweetgum. Seeds and seedlings survive and grow well if the competing vegetation is controlled. The use of heavy equipment is restricted during wet periods.

The seasonal high water table and the hazard of flooding limit the use of the soil as sites for buildings, sanitary landfills, and septic tank absorption fields. Flooding and the water table restrict excavation and limit the use of the soil as recreation areas.

The capability subclass is IIIw.

11B—Catharpin silt loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on broad convex ridgetops. The areas of this soil commonly are long and winding. They range from 2 to 50 acres or more in size.

Typically, the surface layer is yellowish brown silt loam about 9 inches thick. The subsoil is mostly red clay about 67 inches thick. The substratum is mostly weathered rock.

Included with this soil in mapping are small areas of well drained Brockroad and Nason soils, moderately well drained Margo soils, and poorly drained Toddstav soils. Brockroad soils are mainly on broad ridges. Margo and Toddstav soils are at the head of drainageways and along drainageways. Nason soils are mainly on the lower part of slopes. Also included are areas of soils that have a gravelly silt loam surface layer and severely eroded soils that have a yellowish red silty clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderate. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and upland oaks grow well on this soil.

The moderate shrink-swell potential limits the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. The moderate permeability of the subsoil limits the use of this soil as septic tank absorption fields.

The capability subclass is IIe.

12B—Cecil loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on narrow to medium convex ridgetops. The areas of this soil commonly are long and irregularly rounded. They range from 2 to about 20 acres or more in size.

Typically, the surface layer is dark grayish brown loam about 1 inch thick. The subsurface layer is yellowish brown loam about 7 inches thick. The subsoil is mostly red clay and clay loam about 38 inches thick. The substratum is mostly red, yellowish red, and yellowish brown loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Abell soils, somewhat poorly drained to moderately well drained Colfax soils, and well drained Louisburg soils. Abell soils are in depressions, on toe slopes, and along small drainageways. Colfax soils are in saddle positions on toe slopes and along drainageways. Louisburg soils are mainly in the more sloping areas and on the points of ridges. Also included are areas of soils that have a gravelly loam surface layer and severely eroded soils that have a yellowish red clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks are well suited to this soil.

The clayey subsoil limits excavation. Low strength limits the use of the soil for roads. The moderate permeability of the subsoil limits the use of this soil as septic tank absorption fields.

The capability subclass is IIe.

13C2—Cecil-Pacolet complex, 7 to 15 percent slopes, eroded. The soils making up this complex are deep, sloping, and well drained. They are on narrow, convex ridgetops and on convex side slopes. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas are commonly long and winding and range from 2 to 25 acres or more in size. The complex consists of about 45 percent Cecil loam, 35 percent Pacolet sandy loam, and 20 percent other soils.

Typically, the surface layer of the Cecil soil is yellowish brown loam about 5 inches thick. The subsoil is mainly red clay about 38 inches thick. The substratum, to a depth of 60 inches or more, is mostly red, yellowish red, and yellowish brown loam.

Typically, the surface layer of the Pacolet soil is reddish brown sandy loam about 7 inches thick. The subsoil is mostly red clay loam and clay about 20 inches thick. The substratum, to a depth of 60 inches or more, is strongly weathered rock that crushes easily to clay loam and loam.

The other soils included in this complex are the moderately well drained Abell soils, somewhat poorly drained to moderately well drained Colfax soils, poorly drained Fluvaquents, well drained Louisburg soils, and poorly drained Partlow soils. Abell soils are in saddles and at the head of small drainageways. Colfax soils are at the head of drainageways, in saddles, and on toe slopes. Fluvaquents and Partlow soils are along drainageways and small streams. Louisburg soils are near slope breaks. Also included are areas of soils that have a gravelly surface layer and small areas of severely eroded soils that have a red sandy clay loam or clay loam surface layer.

Permeability of the soils making up this complex is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid except in areas that have been limed.

The soils are used mainly as woodland. In some areas they are used as cropland or pasture.

These soils are moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

These soils are well suited to pasture and hay. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer, increases runoff, and increases erosion.

The potential productivity of the soils for trees is moderately high, especially for loblolly pine, yellow-poplar, and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope limits the use of the soils as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of the soils for roads. Slope and the moderate permeability of the subsoil limit the use of the soils as septic tank absorption fields and recreation areas.

The capability subclass is IIIe.

13D2—Cecil-Pacolet complex, 15 to 25 percent slopes, eroded. The soils making up this complex are deep, moderately sloping, and well drained. They are on narrow side slopes that commonly are cut by shallow drainageways. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas range from 2 to more than 10 acres in size. The complex consists of about 40 percent Cecil loam, 40 percent Pacolet fine sandy loam, and 20 percent other soils.

Typically, the surface layer of the Cecil soil is yellowish brown loam about 5 inches thick. The subsoil is mainly red clay about 38 inches thick. The substratum, to a depth of 60 inches or more, is mainly red, yellowish red, and yellowish brown loam.

Typically, the surface layer of the Pacolet soil is reddish brown sandy loam about 5 inches thick. The subsoil is mainly red and is clay loam and clay about 20 inches thick. The substratum, to a depth of 60 inches or more, is strongly weathered rock that crushes easily to clay loam and loam.

The other soils included in this complex are the moderately well drained Abell soils, well drained Louisburg soils, and poorly drained Partlow soils. Abell and Partlow soils are along drainageways and small streams. Louisburg soils are on toe slopes. Also included are small areas of soils that have a gravelly surface layer, areas of severely eroded soils that have a red clay loam surface layer, a few areas where small gullies have formed, and small areas of rock outcrop that are mainly on the steeper part of slopes.

Permeability of the soils making up this complex is moderate, and the available water capacity is moderate. Surface runoff is rapid. Erosion is a very severe hazard. The surface layer is moderately friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils are strongly acid or very strongly acid throughout except in areas that have been limed.

These soils are poorly suited to cultivated crops. The soils are somewhat droughty during the growing season because of the rapid surface runoff, and crop response to lime and fertilizer is somewhat limited because of this lack of moisture. Minimum tillage, terraces, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

These soils are moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas these soils are used as woodland. The potential productivity of these soils for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well. Logging roads and skid trails should be laid out on the contour to reduce runoff and control erosion. The slope limits the safe operation of heavy equipment.

Slope limits the use of the soils as sites for buildings, septic tank absorption fields, and recreation areas. Slope and the clayey subsoil limit their use as sites for sanitary landfills. Low strength limits their use for roads.

The capability subclass is IVe.

14B—Colfax sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, somewhat poorly drained to moderately well drained soil on saddles, in depressions, on toe slopes, and along small drainageways. The areas of this soil are elongated, and are irregularly oval or rectangular. They range from 2 to about 20 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 1 inch thick. The subsurface layer is pale brown sandy loam about 6 inches thick. The upper part of the subsoil is yellowish brown, brownish yellow, and light brownish gray sandy clay loam about 11 inches thick. The middle part is a fragipan—a brittle, compact layer of light yellowish brown sandy clay loam about 7 inches thick. Below the fragipan the subsoil is light brownish gray clay loam and yellowish brown sandy clay loam about 18 inches thick. The substratum is light brownish gray, brownish yellow, white, and gray, strongly weathered rock that crushes easily to sandy loam.

Included with this soil in mapping are small areas of moderately well drained Abell soils, well drained Appling and Cecil soils, and poorly drained Partlow soils. Abell soils are along small drainageways, in small saddles, and on toe slopes. Appling and Cecil soils are in higher areas scattered throughout the map unit. Partlow soils are along small drainageways. Also included are small areas of soils that have a loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is slow, and the available water capacity is low. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 25 inches. Below that, root growth is restricted by the fragipan. The organic matter content and natural fertility are low. The surface layer and subsoil commonly are strongly acid or very strongly acid except in areas that have been limed. In many areas the soil dries slowly in spring and after heavy rains. A seasonal high water table is at a depth of 1/2 foot to 1 1/2 feet in winter and early in spring.

In most areas this soil is used as woodland. In some areas it is used as cropland, and in some areas it is in pasture.

This soil is moderately well suited to cultivated crops. Deep-rooted crops commonly are stunted or short-lived because of wetness and the restricted rooting depth. The soil is droughty during the growing season. Crop response to lime and fertilizer is limited because of the low available water capacity. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet causes compaction of the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, sweetgum, and yellow-poplar grow moderately well. The use of heavy equipment is limited during wet periods. Windthrow causes some losses when the soil is wet because of the limited rooting depth above the fragipan.

The seasonal high water table causes dampness in basements and crawl spaces in winter and spring and limits the use of the soil for sanitary landfills. The slow permeability of the subsoil limits the use of the soil as septic tank absorption fields. A suitable base material is necessary to provide strength to the soil if it is used for roads.

The capability subclass is IIIw.

14C—Colfax sandy loam, 7 to 15 percent slopes. This is a deep, sloping, somewhat poorly drained to moderately well drained soil on toe slopes and along small drainageways. The areas of this soil are elongated, irregularly oval, or rectangular. They range from 2 to about 15 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 1 inch thick. The subsurface layer is

pale brown sandy loam about 6 inches thick. The upper part of the subsoil is yellowish brown, brownish yellow, and light brownish gray sandy clay loam about 11 inches thick. The middle part is a fragipan—a brittle, compact layer of light yellowish brown sandy clay loam about 7 inches thick. Below the fragipan the subsoil is light brownish gray clay loam and yellowish brown sandy clay loam about 18 inches thick. The substratum is light brownish gray, brownish yellow, white, and gray, strongly weathered rock that crushes easily to sandy loam.

Included with this soil in mapping are small areas of moderately well drained Abell soils, well drained Appling and Cecil soils, and poorly drained Partlow soils. Abell soils are along small drainageways, in small saddles, and on toe slopes. Appling and Cecil soils are in higher areas throughout the map unit. Partlow soils are along small drainageways. Also included are small areas of soils that have a loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is slow, and the available water capacity is low. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 25 inches. Below that depth, root growth is restricted by the fragipan. The organic matter content and natural fertility are low. The surface layer and subsoil commonly are strongly acid or very strongly acid except in areas that have been limed. In many areas the soil dries slowly in spring and after heavy rains. A seasonal high water table is at a depth of 1/2 foot to 1 1/2 feet in winter and early in spring.

In most areas this soil is used as woodland. In many areas it is used as cropland, and in some areas it is in pasture.

This soil is moderately well suited to cultivated crops. Deep-rooted crops commonly are stunted or short-lived because of wetness and the restricted rooting depth. The soil is droughty during the growing season. Crop response to lime and fertilizer is limited because of the low available water capacity. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, sweetgum, and yellow-poplar grow moderately well on this soil. The use of heavy equipment is restricted during wet periods. Windthrow causes some losses when the soil is wet because of the limited rooting depth above the fragipan.

The seasonal high water table causes dampness in basements and crawl spaces in winter and spring and limits the use of the soil for sanitary landfills. The slope and slow permeability of the subsoil limits the use of the soil as septic tank absorption fields. A suitable base material is necessary to provide strength to the soil if it is used for roads.

The capability subclass is IIIe.

15B2—Cullen loam, 2 to 7 percent slopes, eroded. This is a deep, gently sloping, well drained soil on narrow to broad convex ridgetops. The areas of this soil commonly are irregularly rounded or oblong. They range from 2 to about 15 acres or more in size.

Typically, the surface layer is reddish brown loam about 8 inches thick. The subsoil is mostly red clay about 36 inches thick. The substratum, to a depth of more than 60 inches, is mostly yellowish red and yellowish brown clay loam.

Included with this soil in mapping are small areas of well drained Fluvanna, Louisburg, Poindexter, and Tatum soils. Fluvanna and Tatum soils are in positions on the landscape similar to those of Cullen loam, 2 to 7 percent slopes, eroded. Louisburg and Poindexter soils are in the more sloping areas. Also included are areas of soils that have bedrock at a depth of about 24 inches and severely eroded soils that have a red clay loam or clay surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable. It can be easily tilled when moist but breaks into clods if it is tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is medium acid or strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil.

The moderate shrink-swell potential limits the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. The moderate permeability of the subsoil limits use of the soil as septic tank absorption fields.

The capability subclass is IIe.

15C2—Cullen loam, 7 to 15 percent slopes, eroded. This is a deep, sloping, well drained soil on narrow convex ridgetops and on convex side slopes. The areas of this soil commonly are long and winding. They range from 2 to about 20 acres or more in size.

Typically, the surface layer is reddish brown loam about 6 inches thick. The subsoil is mostly red clay about 36 inches thick. The substratum, to a depth of 60 inches or more, is mostly yellowish red and yellowish brown clay loam.

Included with this soil is mapping are small areas of well drained Fluvanna, Louisburg, Poindexter, and Tatum soils. Fluvanna and Tatum soils are in positions on the landscape similar to those of Cullen loam, 7 to 15 percent slopes, eroded. Louisburg and Poindexter soils are in the more sloping areas of this map unit. Also included are areas of soils that have bedrock at a depth of about 24 inches and areas of severely eroded soils that have a red clay loam or clay surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable. It can be easily tilled when moist but breaks into clods if it is tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The organic matter content and natural fertility are low. The soil commonly is medium acid or strongly acid throughout except in areas that have been treated with lime.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high, especially for loblolly pine, yellow-poplar, and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope and the moderate shrink-swell potential limit the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. Slope and the moderate permeability limit use as septic tank absorption fields and as recreation areas.

The capability subclass is IIIe.

15D2—Cullen loam, 15 to 25 percent slopes, eroded. This is a deep, moderately steep, well drained soil on narrow convex side slopes. The slopes commonly are dissected by waterways. The areas of this soil are elongated or are long and winding. They range from 2 to 10 acres or more in size.

Typically, the surface layer is reddish brown loam about 6 inches thick. The subsoil is mostly red clay about 38 inches thick. The substratum is yellowish red and yellowish brown clay loam.

Included with this soil in mapping are small areas of well drained Fluvanna, Louisburg, Poindexter, and Tatum soils. Fluvanna and Tatum soils are in positions on the landscape similar to those of Cullen loam, 15 to 25 percent slopes, eroded. Louisburg and Poindexter soils are mainly in the more sloping areas. Also included are small areas of soils that have bedrock at a depth of about 24 inches, areas of severely eroded soils that have a red clay or clay loam surface layer, a few areas where small gullies have formed, and small areas of rock outcrop that are mainly on the lower part of slopes. The included areas make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is rapid. Erosion is a very severe hazard. The surface layer is moderately friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is medium acid or strongly acid throughout except in areas that have been limed.

This soil is poorly suited to cultivated crops. It is somewhat droughty during the growing season because of the rapid surface runoff, and crop response to lime and fertilizer is somewhat limited because of the lack of moisture. Minimum tillage, terraces, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of the soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil. Logging roads and skid trails should be laid out on the contour to reduce concentrated runoff and to control erosion. The slope limits the safe operation of heavy equipment.

Slope limits the use of the soil as sites for buildings, septic tank absorption fields, and recreation areas. Slope and the clayey subsoil limit the use of the soil for sanitary landfills. Low strength limits its use for roads.

The capability subclass is IVe.

16—Dogue loam. This is a nearly level, moderately well drained soil on broad terraces along the larger streams. The areas of this soil are elongated or are irregularly rounded and are slightly concave. They range from 2 to about 20 acres or more in size.

Typically, the surface layer is dark yellowish brown loam about 10 inches thick. The subsoil is mostly yellowish brown clay and sandy clay loam about 43 inches thick. There are gray mottles below a depth of about 26 inches. The substratum, to a depth of 60 inches or more, is yellowish brown and gray gravelly sand.

Included with this soil in mapping are small areas of moderately well drained Altavista soils, poorly drained Aquults, and well drained Wickham soils. Areas of Altavista soils are scattered throughout the map unit. Aquults are in depressions and along small drainageways. Wickham soils are in small, slightly higher areas throughout the map unit. The included soils make up about 15 percent of the map unit.

Permeability is moderately slow, and the available water capacity is moderate. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid except in areas that have been limed. A seasonal high water table is at a depth of 1 1/2 to 3 feet during winter and spring.

In most areas this soil is used as cropland, or it is used as woodland. This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Alfalfa is short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is high, especially for loblolly pine, yellow-poplar, and upland oaks. Seeds and seedlings grow well if competing vegetation is controlled.

The seasonal high water table limits the use of this soil for sanitary landfills. The moderate shrink-swell potential limits its use as sites for buildings, and the clayey subsoil limits excavation. Low strength limits use for roads. The slow permeability of the subsoil limits the use of the soil as septic tank absorption fields.

The capability subclass is IIw.

17C—Dystrochrepts-Udults complex, sloping. The soils making up this complex are deep and are somewhat excessively drained to moderately well drained. They are on narrow convex ridgetops, on side slopes, and on terrace breaks. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas are long and winding and range from 5 to about 40 acres or more in size. The slopes range from 7 to 15 percent. The complex consists of about 50 percent Dystrochrepts, 40 percent Udults, and 10 percent other soils.

Typically, the surface layer of Dystrochrepts is brown or yellowish brown loamy sand or sandy loam about 6 to 14 inches thick. The subsoil is commonly yellowish brown, light olive brown, or brownish yellow sandy loam or loamy sand up to 10 inches thick. The substratum, to a depth of 60 inches or more, is stratified sandy, loamy, or clayey sediment.

Typically, the surface layer of Udults is grayish brown, brown, or yellowish brown sandy loam, but it ranges to clay in some places. It is about 6 to 16 inches thick. The subsoil ranges from red to olive brown and from sandy loam to clay. It is 4 to more than 70 inches thick. The substratum is stratified sandy, loamy, or clayey sediment.

The other soils included in this complex are the poorly drained Fluvaquents and the moderately well drained or well drained Udifluvents. These soils are along drainageways and small streams. Also included are gullied and severely eroded soils, small borrow pits, and small sand and gravel pits.

Permeability of the soils making up this complex is rapid to slow, and the available water capacity is moderate to low. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable and can be easily tilled. The subsoil has a low to moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils are strongly acid to extremely acid throughout. In some places a seasonal high water table is at a depth of 2 to 3 feet during winter and early in spring. Seeps or springs along the lower edge of slopes are common.

These soils are poorly suited to cultivated crops and are moderately well suited to pasture. The soils are droughty during the growing season, and plant response

to lime and fertilizer is limited because of this lack of moisture. Maintaining a mixture of grasses and legumes, proper stocking, and rotation and deferred grazing help increase the carrying capacity of the pasture and control erosion. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas these soils are used as woodland. The potential productivity of these soils for trees is high, especially for loblolly pine and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

In some places the low to moderate shrink-swell potential, the seasonal high water table, and low soil strength are limitations for nonfarm uses. Slope limits the use of the soils as sites for buildings, septic tank absorption fields, and sanitary landfills. If the soils are used for roads, a suitable base material is necessary in most places to provide strength and stability.

A capability class was not assigned.

17D—Dystrochrepts-Udults complex, moderately steep. The soils making up this complex are deep and are somewhat excessively drained to moderately well drained. They are on side slopes and terrace breaks. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas are long and winding and range from 5 to 100 acres or more in size. The slopes range from 15 to 25 percent. The complex consists of about 50 percent Dystrochrepts, 40 percent Udults, and 10 percent other soils.

Typically, the surface layer of Dystrochrepts is brown or yellowish brown loamy sand or sandy loam about 6 to 14 inches thick. The subsoil is commonly yellowish brown, light olive brown, or brownish yellow sandy loam or loamy sand up to 10 inches thick. The substratum, to a depth of 60 inches or more, is stratified sandy, loamy, or clayey sediment.

Typically, the surface layer of Udults is grayish brown, brown, or yellowish brown sandy loam, but it ranges to clay in some places. It is about 6 to 16 inches thick. The subsoil ranges from red to olive brown and from sandy loam to clay. It is 4 to more than 70 inches thick. The substratum is stratified sandy, loamy, or clayey sediment.

The other soils included in this complex are the poorly drained Fluvaquents and the moderately well drained or well drained Udifluvents. These soils are along drainageways and small streams. Also included are gullied soils, severely eroded soils, small borrow pits, and small sand and gravel pits.

Permeability of the soils making up this complex is rapid to slow, and the available water capacity is moderate to low. Surface runoff is rapid. Erosion is a very severe hazard. The surface layer is friable, and the subsoil has a low to moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils are strongly acid to extremely acid throughout. In some places a seasonal high water table is at a depth of 2 to 3 feet during winter and early in spring. Seeps or springs along the lower edge of slopes are common.

These soils are not suited to cultivated crops and are moderately well suited to pasture. The soils are droughty during the growing season, and plant response to lime and fertilizer is limited because of this lack of moisture. Maintaining a mixture of grasses and legumes, proper stocking, and rotation and deferred grazing help increase the carrying capacity of the pasture and control erosion. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas these soils are used as woodland. The potential productivity of these soils for trees is high, especially for loblolly pine and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. Logging roads and skid trails should be laid out on the contour to reduce concentrated runoff and control erosion. Slope limits the safe operation of heavy equipment.

In some places the low to moderate shrink-swell potential, the seasonal high water table, and low soil strength are limitations for nonfarm uses. Slope limits the use of the soils as sites for buildings, septic tank absorption fields, and sanitary landfills. In most places a suitable base material is necessary to provide strength and stability to the soils if they are used to support vehicular traffic.

A capability class was not assigned.

17E—Dystrochrepts-Udults complex, steep. The soils making up this complex are deep and are somewhat excessively drained to moderately well drained. They are on narrow, convex ridgetops, on side slopes, and on terrace breaks. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas are long and winding and range from 5 to about 200 acres or more in size. The complex consists of about 50 percent Dystrochrepts, 40 percent Udults, and 10 percent other soils.

Typically, the surface layer of Dystrochrepts is brown or yellowish brown loamy sand or sandy loam about 6 to 14 inches thick. The subsoil is commonly yellowish brown, light olive brown, or brownish yellow sandy loam or loamy sand up to 10 inches thick. The substratum, to a depth of 60 inches or more, is stratified sandy, loamy, or clayey sediment.

Typically, the surface layer of Udults is grayish brown, brown, or yellowish brown sandy loam, but it ranges to clay in some places. It is about 6 to 16 inches thick. The subsoil ranges from red to olive brown and from sandy loam to clay. It is 4 to more than 70 inches thick. The substratum is stratified sandy, loamy, or clayey sediment.

The other soils included in this complex are the poorly drained Fluvaquents and the moderately well drained or

well drained Udifluvents. These soils are along drainageways and small streams. Also included are gullied soils, severely eroded soils, small borrow pits, and small sand and gravel pits.

Permeability of the soils making up this complex is rapid to slow, and the available water capacity is moderate to low. Surface runoff is rapid. Erosion is a very severe hazard. The subsoil has a low to moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils are strongly acid to extremely acid throughout. In some places a seasonal high water table is at a depth of 2 to 3 feet during winter and early in spring. Seeps and springs are common along the lower edges of slopes.

These soils are not suited to cultivated crops and are poorly suited to pasture. The soils are droughty during the growing season. Maintaining a mixture of grasses and legumes, proper stocking, and rotation and deferred grazing help increase the carrying capacity of the pasture and control erosion. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas these soils are used as woodland. The potential productivity of these soils for trees is high, especially for loblolly pine and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. Logging roads and skid trails should be laid out on the contour to reduce concentrated runoff and control erosion. Slope limits the safe operation of heavy equipment.

Slope limits the use of the soils as sites for buildings, septic tank absorption fields, and sanitary landfills.

A capability subclass was not assigned.

18B—Emporia sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on broad, slightly convex ridgetops. The areas of this soil commonly are irregularly rounded or oblong. They range from 2 to 30 acres or more in size.

Typically, the surface layer is dark grayish brown sandy loam about 1 inch thick. The subsurface layer is pale brown sandy loam about 8 inches thick. The subsoil is mostly yellowish brown and strong brown sandy loam and sandy clay loam about 50 inches thick. The substratum to a depth of 70 inches or more is mostly yellowish brown sandy clay loam. It has gray and red mottles.

Included with this soil in mapping are small areas of well drained Faceville soils and moderately well drained Goldsboro and Mattaponi soils. Areas of Faceville and Mattaponi soils are scattered throughout the map unit. Goldsboro soils are in small upland depressions, at the head of drainageways, and along drainageways. Also included are areas of soils that have a gravelly sandy loam surface layer and severely eroded soils that have a yellowish brown or brown sandy clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate or moderately slow, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed. A seasonal high water table is at a depth of 3 to 4 1/2 feet during winter and spring.

In most areas this soil is used as woodland. In some areas it is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and upland oaks grow well on this soil.

The seasonal high water table limits the use of the soil as sites for buildings and also limits excavation. The moderate or moderately slow permeability of the subsoil limits the use of the soil as septic tank absorption fields.

The capability subclass is IIe.

18C—Emporia sandy loam, 7 to 15 percent slopes. This is a deep, sloping, well drained soil on side slopes. The areas of this soil commonly are convex and irregularly rounded to long and narrow. They range from 2 to about 10 acres or more in size.

Typically, the surface layer is pale brown sandy loam about 7 inches thick. The subsoil is mostly yellowish brown and strong brown sandy loam and sandy clay loam about 52 inches thick. The substratum is mostly yellowish brown sandy clay loam, to a depth of 70 inches or more, and it is gray and red mottled.

Included with this soil in mapping are small areas of well drained Faceville soils and moderately well drained Goldsboro and Mattaponi soils. Areas of Faceville and Mattaponi soils are scattered throughout the map unit. Goldsboro soils are at the head of drainageways and along drainageways. Also included are soils that have a gravelly sandy loam surface layer and severely eroded soils that have a yellowish brown or brown sandy clay

loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate or moderately slow, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled when it is moist. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed. A seasonal high water table is at a depth of 3 to 4 1/2 feet during winter and spring.

In most areas this soil is used as woodland. In some areas it is used as cropland.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high, especially for loblolly pine and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope limits the use of the soil as sites for buildings. Slope and the moderate or moderately slow permeability of the subsoil limit the use of the soil as septic tank absorption fields and recreation areas.

The capability subclass is IIIe.

19B—Faceville loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on broad convex ridgetops. The areas of this soil commonly are irregularly rounded or oblong. They range from 2 to about 20 acres or more in size.

Typically, the surface layer is dark brown loam about 2 inches thick. The subsurface layer is brown loam about 8 inches thick. The subsoil is mostly red clay, to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Emporia soils and moderately well drained Goldsboro and Savannah soils. Areas of Emporia and Savannah soils are scattered throughout the map unit. Goldsboro soils are in small upland depressions, at the head of drainageways, and along drainageways. Also included are areas of soils that have a gravelly loam surface layer and severely eroded soils that have a reddish brown loam and clay loam surface layer. The included soils make up about 15 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed.

In many areas this soil is used as woodland. Some of the acreage is used as cropland, and in some areas the soil is used for urban development (fig. 3).

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to pasture and hay. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of the soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and upland oaks grow well on this soil.

The clayey subsoil limits excavation. Low strength limits the use of the soil for roads.

The capability subclass is IIe.

20B—Faceville-Marlboro complex, 2 to 7 percent slopes. The soils making up this complex are deep, gently sloping, and well drained. They are on broad convex ridgetops. The Marlboro soil is most commonly in the flatter areas but is scattered throughout the map unit. The areas of Faceville and Marlboro soils are so intermingled that it was not practical to map the soils separately. The mapped areas are oblong or irregularly rounded and range from 2 to about 30 acres or more in size. The complex consists of about 40 percent Faceville loam, 40 percent Marlboro fine sandy loam, and 20 percent other soils.

Typically, the surface layer of the Faceville soil is brown loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. It is mostly red clay.

Typically, the surface layer of the Marlboro soil is dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is pale brown fine sandy loam about 13 inches thick. The subsoil is mostly yellowish brown and strong brown clay. It extends to a depth of 60 inches or more.

The other soils included in this complex are the well drained Emporia soils and the moderately well drained Goldsboro and Savannah soils. Emporia and Savannah

Figure 3.—Housing development on well drained Faceville loam, 2 to 7 percent slopes. Appling-Wedowee sandy loams, 7 to 15 percent slopes, eroded, are in the foreground.

soils are in small scattered areas. Goldsboro soils are on small flats and along small drainageways. Also included are small areas of severely eroded soils that have a yellowish red or reddish brown clay loam surface layer and areas of soils that have a gravelly surface layer.

Permeability of the soils making up this complex is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer of these soils is friable and can be easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils commonly are strongly acid or very strongly acid except in areas that have been limed.

These soils are used mainly as woodland. In some areas they are used as cropland, and in some areas they are used for urban development (fig. 3).

These soils are well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

These soils are well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of these soils for trees is moderately high, especially for loblolly pine and upland oaks. Seeds and seedlings grow well if competing vegetation is controlled.

The clayey subsoil limits excavation. Low strength limits the use of the soils for roads. The moderate permeability of the subsoil limits the use of these soils for septic tank absorption fields.

The capability subclass is IIe.

20C2—Faceville-Marlboro complex, 7 to 15 percent slopes, eroded. The soils making up this complex are deep, sloping, and well drained. They are on convex side slopes. The Marlboro soil is in the less sloping areas. The areas of Faceville and Marlboro soils are so intermingled that it was not practical to map the soils separately. The mapped areas are long and narrow and range from 2 to about 20 acres in size. The complex consists of about 45 percent Faceville loam, 35 percent Marlboro fine sandy loam, and 20 percent other soils.

Typically, the surface layer of the Faceville soil is brown loam about 10 inches thick. The subsoil, to a depth of 60 inches or more, is mostly red clay.

Typically, the surface layer of the Marlboro soil is dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is pale brown fine sandy loam about 13 inches thick. The subsoil is mostly yellowish brown and strong brown clay. It extends to a depth of 60 inches or more.

The other soils included in this complex are the well drained Emporia soils and the moderately well drained Savannah and Mattaponi soils. Emporia and Savannah soils are in small areas scattered throughout the complex. Mattaponi soils are on the steeper slopes. Also included are small areas of severely eroded soils that have a yellowish brown, reddish brown, or red clay loam surface layer.

Permeability of the soils making up this complex is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer of these soils is friable and can be easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils commonly are strongly acid or very strongly acid except in areas that have been limed.

In most areas these soils are used as woodland. In some areas they are used as cropland, and in some areas they are used for urban development.

These soils are moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

These soils are moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of the soils for trees is moderately high, especially for loblolly pine and upland oaks. Seeds and seedlings grow well if competing vegetation is controlled.

Slope limits the use of these soils as sites for buildings, and the clayey subsoil limits excavation. Slope and low strength limit the use of these soils for roads. The moderate permeability of the subsoil limits the use of these soils for septic tank absorption fields.

The capability subclass is IIIe.

21B—Faceville-Varina complex, 2 to 7 percent slopes. The soils making up this complex are deep, gently sloping, and well drained. They are on broad convex ridgetops. The Varina soil is in scattered areas but most commonly is on slope breaks. The areas of Faceville and Varina soils are so intermingled that it was not practical to map the soils separately. The mapped areas are oblong or are irregularly rounded. They range from 2 to about 50 acres or more in size. The complex consists of about 45 percent Faceville loam, 35 percent Varina sandy loam, and 20 percent other soils.

Typically, the surface layer of the Faceville soil is dark brown and pale brown loam about 10 inches thick. The subsoil, to a depth of 60 inches or more, is mostly red clay.

Typically, the surface layer of the Varina soil is light yellowish brown sandy loam about 9 inches thick. The subsoil is mostly strong brown and yellowish brown clay loam and clay to a depth of about 42 inches and brownish yellow, red, and gray sandy clay and clay loam to a depth of 80 inches or more.

The other soils included in this complex are the well drained Emporia soils and the moderately well drained Goldsboro, Mattaponi, and Savannah soils. Emporia, Mattaponi, and Savannah soils are in small areas scattered throughout the complex. Goldsboro soils are on small flats and along small drainageways. Also included are small areas of severely eroded soils that have a yellowish red or reddish brown clay loam surface layer and soils that have a gravelly surface layer.

Permeability of the soils in this complex is moderate to slow. The available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer of these soils is friable and can be easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils are commonly strongly acid or very strongly acid except in areas that have been limed.

In most areas these soils are used as woodland. In some areas they are used as cropland or for urban development.

These soils are well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage,

contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

These soils are well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of these soils for trees is moderately high, especially for loblolly pine and upland oaks. Seeds and seedlings grow well if competing vegetation is controlled.

The clayey subsoil limits excavation. Low strength limits the use of the soils for roads. The moderate to slow permeability of the subsoil limits the use of the soils for septic tank absorption fields.

The capability subclass is IIe.

21C2—Faceville-Varina complex, 7 to 15 percent slopes, eroded. The soils making up this complex are deep, sloping, and well drained. They are on convex side slopes. The Varina soil is most commonly near slope breaks. The areas of Faceville and Varina soils are so intermingled that it was not practical to map the soils separately. The mapped areas are long and narrow and range from 2 to about 20 acres or more in size. The complex consists of about 45 percent Faceville loam, 35 percent Varina sandy loam, and 20 percent other soils.

Typically, the surface layer of the Faceville soil is dark brown and pale brown loam about 6 inches thick. The subsoil, to a depth of 60 inches or more, is mostly red clay.

Typically, the surface layer of the Varina soil is light yellowish brown sandy loam about 6 inches thick. The subsoil is mostly strong brown and yellowish brown clay loam and clay to a depth of about 40 inches, and it is brownish yellow, red, and gray sandy clay and clay loam to a depth of 80 inches or more.

The other soils included in this complex are the well drained Emporia soils and the moderately well drained Goldsboro, Mattaponi, and Savannah soils. Emporia, Mattaponi, and Savannah soils are in small areas scattered throughout the complex. Goldsboro soils are along small drainageways. Also included are small areas of severely eroded soils that have a yellowish brown, reddish brown, or red clay loam surface layer and areas of soils that have a gravelly surface layer.

Permeability of the soils making up this complex is moderate to slow, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer of these soils is friable and can be easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils are commonly strongly acid or very strongly acid except in areas that have been limed. The Varina soil has a perched seasonal high water table at a depth of 4 to 5 feet in winter and spring.

In most areas these soils are used as woodland. In some areas they are used as cropland or for urban development.

These soils are moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

These soils are moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of these soils for trees is moderately high, especially for loblolly pine and upland oaks. Seeds and seedlings grow well if competing vegetation is controlled.

Slope limits the use of these soils as sites for buildings, and the clayey subsoil limits excavation. Slope and low strength limit the use of these soils for roads. The moderate to slow permeability of the subsoil limits the use of these soils for septic tank absorption fields.

The capability subclass is IIIe.

22B—Fluvanna fine sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on narrow to broad, convex ridgetops. The areas of this soil commonly are irregularly rounded or oval. They range from 2 to about 40 acres or more in size.

Typically, the surface layer is dark brown fine sandy loam about 1 inch thick. The subsurface layer is brown fine sandy loam about 6 inches thick. The subsoil is mostly yellowish red and yellowish brown clay about 42 inches thick. The substratum is mostly yellowish brown clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained to moderately well drained Orange soils and well drained Poindexter, Nason, and Tatum soils. Areas of Orange, Nason, and Tatum soils are scattered throughout the map unit. Poindexter soils are mainly on the lower part of slopes. Also included are soils that have a gravelly fine sandy loam surface layer, severely eroded soils that have a yellowish brown clay loam surface layer, and small areas of rock outcrop. The included areas make up about 20 percent of the map unit.

Permeability is slow or moderately slow, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a

moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland. Some of the acreage is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, including grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and upland oaks grow well on this soil.

The moderate shrink-swell potential limits the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of the soil for roads. The slow or moderately slow permeability of the subsoil limits the use of this soil for septic tank absorption fields.

The capability subclass is IIe.

22C2—Fluvanna fine sandy loam, 7 to 15 percent slopes, eroded. This is a deep, sloping, well drained soil on narrow convex ridgetops and convex side slopes. Most slopes are complex and commonly are long and winding. The mapped areas range from 2 to about 30 acres or more in size.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish red and yellowish brown clay about 40 inches thick. The substratum, to a depth of 60 inches or more, is mostly yellowish brown clay loam.

Included with this soil in mapping are small areas of somewhat poorly drained to moderately well drained Colfax soils, well drained Poindexter, Nason, and Tatum soils, and poorly drained Fluvaquents. Colfax soils are around the head of and along drainageways and on toe slopes. Areas of Poindexter, Nason, and Tatum soils are scattered throughout the map unit. Fluvaquents are along drainageways. Also included are soils that have a gravelly fine sandy loam surface layer, severely eroded soils that have a yellowish brown clay loam surface layer, and small areas of rock outcrop. The included areas make up about 20 percent of this map unit.

Permeability is slow or moderately slow, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderately high, especially for loblolly pine and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope and the moderate shrink-swell potential limit the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of the soil for roads. Slope and the slow or moderately slow permeability of the subsoil limit the use of the soil for septic tank absorption fields and recreation areas.

The capability subclass is IIIe.

22D2—Fluvanna fine sandy loam, 15 to 25 percent slopes, eroded. This is a deep, moderately steep, well drained soil on convex side slopes. The slopes are smooth and commonly are complex. The areas of this soil are oval or are long and winding. They range from 2 to 20 acres or more in size.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish red and yellowish brown clay about 40 inches thick. The substratum to a depth of 60 inches or more is yellowish brown clay loam.

Included with this soil in mapping are small areas of poorly drained Fluvaquents and well drained Louisburg, Poindexter, Nason, and Tatum soils. Fluvaquents are along drainageways and small streams. Louisburg soils are mainly on the lower part of slopes. Areas of Poindexter, Nason, and Tatum soils are scattered throughout the map unit. Also included are small areas of soils that have a gravelly fine sandy loam surface layer, areas of severely eroded soils that have a yellowish brown clay loam surface layer, a few areas where small gullies have formed, and small areas of rock

outcrop. The included areas make up about 20 percent of the map unit.

Permeability is slow or moderately slow, and the available water capacity is moderate. Surface runoff is rapid. Erosion is a very severe hazard. The surface layer is moderately friable. It can be easily tilled when moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

This soil is poorly suited to cultivated crops. It is somewhat droughty during the growing season because of the rapid surface runoff, and crop response to lime and fertilizer is somewhat limited because of the lack of moisture. Minimum tillage, terraces, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and upland oaks grow well on this soil. Logging roads and skid trails should be laid out on the contour to reduce runoff and control erosion. Slope limits the safe operation of heavy equipment.

Slope limits the use of the soil as sites for buildings, septic tank absorption fields, and recreation areas. Slope and the clayey subsoil limit its use for sanitary landfills. Slope and low strength limit its use for roads.

The capability subclass is IVe.

23—Fluvaquents-Udifluvents complex. The soils making up this complex are deep, nearly level, and poorly drained to well drained. They are on bottom land along streams and large drainageways. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas commonly are long, narrow, and winding. They range in size from 2 to 50 acres or more. The slopes range from 0 to 2 percent. The complex consists of about 55 percent Fluvaquents, 30 percent Udifluvents, and 15 percent other soils.

Typically, the surface layer of the Fluvaquents is dark grayish brown or dark brown and ranges from loamy sand to silt loam. It averages about 10 inches in thickness. The underlying layers, to a depth of 60 inches or more, are commonly gray, dark gray, or light gray and are mottled with brighter colors. The underlying layers range from sand to clay.

Typically, the surface layer of the Udifluvents is grayish brown or brown and ranges from loamy sand to silt loam. The underlying layers are commonly brown or yellowish brown and have gray mottles in some places. In some places, the underlying layers are gray below a depth of 30 to 40 inches. They range from sand and loamy sand to silt loam, loam, clay loam, and clay.

The other soils included in this complex are poorly drained and somewhat poorly drained Aquults, poorly drained Partlow soils, moderately well drained Altavista soils, and well drained Wickham soils. Aquults are in depressions and at the base of slopes. Partlow soils commonly are next to drainageways. Altavista and Wickham soils are in slightly higher, long, narrow areas next to uplands.

Permeability of the soils making up this complex is moderately rapid to moderately slow, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The underlying layers commonly have a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content is low to moderate, and natural fertility is low. The soils commonly are strongly acid to extremely acid throughout. They are frequently flooded for brief periods during the winter and spring, after heavy rains, and during prolonged wet periods throughout the year. A seasonal high water table is between the surface and a depth of 3 feet during the winter and spring and after flooding throughout the year.

In most areas these soils are used as woodland. In some areas they are in pasture, and in small areas they are used for gardens.

These soils are not suited to cultivated crops, hay, or pasture unless they are drained and protected from flooding. Overgrazing when the soils are wet compacts the surface layer and damages stands of grasses and legumes.

The potential productivity of these soils for trees is high, especially for sweetgum, sycamore, and willow oak. Seeds and seedlings survive and grow well if competing vegetation is controlled. The use of heavy equipment is limited during wet periods.

The seasonal high water table and the hazard of flooding limit the use of the soils as sites for buildings, recreation areas, septic tank absorption fields, and sanitary landfills.

A capability subclass was not assigned.

24—Goldsboro sandy loam. This is a deep, nearly level, moderately well drained soil in broad low areas. Most areas of this soil are elongated, but some smaller areas are irregularly oval and slightly concave. The mapped areas range from 2 to about 20 acres in size. The slopes commonly are 0 to 4 percent.

Typically, the surface layer is light brownish gray sandy loam about 12 inches thick. The subsoil is mostly brownish yellow and gray sandy clay loam and clay loam about 50 inches thick. The substratum, to a depth of 77 inches or more, is gray clay loam.

Included with this soil in mapping are small areas of poorly drained Aquults, well drained Emporia and Suffolk soils, and moderately well drained Savannah soils. Aquults are at the head of and along drainageways. Emporia, Savannah, and Suffolk soils are mainly close to uplands. Also included are soils that have a gravelly sandy loam surface layer and soils that have a loam surface layer. The included soils make up about 25 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid to extremely acid throughout except in areas that have been limed. This soil is ponded occasionally for very brief periods during the spring and early in summer after heavy rains. The seasonal high water table is at a depth of 2 to 3 feet during winter and early in spring.

In most areas this soil is used as woodland. In some areas it is used as cropland, and in a few areas it is in pasture.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. The soil is wet and cold early in spring, and wetness often delays tillage. In a few small areas, crops are damaged by very brief ponding during the spring and early in summer. Drainage and control of ponding help alleviate spring wetness and reduce crop damage. Minimum tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Alfalfa is often short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and damages stands of grasses and legumes.

The potential productivity for trees is high, especially for loblolly pine, sweetgum, and upland oaks. Seeds and seedlings survive and grow well. The use of heavy equipment is limited during wet periods.

The seasonal high water table limits the use of the soil as sites for buildings, sanitary landfills, and septic tank absorption fields. A suitable base material is necessary to provide strength and stability to the soil if it is used for roads.

The capability subclass is IIw.

25B—Kempsville gravelly sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on convex ridgetops. The areas of this soil commonly are elongated or are irregularly rectangular. They range from 2 to about 20 acres or more in size.

Typically, the surface layer is very dark grayish brown gravelly sandy loam about 1 inch thick. The subsurface layer is pale brown gravelly sandy loam about 12 inches thick. The subsoil is mostly strong brown and yellowish red gravelly sandy loam and gravelly sandy clay loam about 31 inches thick. The substratum is mostly yellowish brown and reddish yellow gravelly sandy clay loam, to a depth of 60 inches or more.

Included with this soil in mapping are small, scattered areas of well drained Bama, Emporia, Faceville, and Suffolk soils. Also included are soils that have a gravelly loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland or brushy pasture. In some areas it is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil.

The low strength of the soil limits its use for roads. The moderate permeability of the subsoil limits the use of the soil for septic tank absorption fields.

The capability subclass is IIe.

25C—Kempsville gravelly sandy loam, 7 to 15 percent slopes. This is a deep, sloping, well drained soil on convex ridgetops and side slopes and on the points

of ridges. The areas of this soil commonly are elongated or are long and winding. They range from 2 to about 30 acres or more in size.

Typically, the surface layer is very dark grayish brown gravelly sandy loam about 1 inch thick. The subsurface layer is pale brown gravelly sandy loam about 12 inches thick. The subsoil is mostly strong brown and yellowish red gravelly sandy loam and gravelly sandy clay loam about 31 inches thick. The substratum, to a depth of 60 inches or more, is mostly yellowish brown and reddish yellow gravelly sandy clay loam.

Included with this soil in mapping are small areas of poorly drained Fluvaquents along drainageways and small, scattered areas of well drained Emporia, Faceville, and Varina soils. The included soils make up about 15 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable and can be easily tilled when it is moist. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation grazing, deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high, especially for loblolly pine, yellow-poplar, and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope limits the use of the soil as sites for buildings. Slope and low strength limit its use for roads. Slope and the moderate permeability of the subsoil limit the use of this soil for septic tank absorption fields and recreation areas.

The capability subclass is IIIe.

25D—Kempsville gravelly sandy loam, 15 to 25 percent slopes. This is a deep, moderately steep, well drained soil on side slopes that are commonly dissected by waterways. The slopes commonly are complex. The areas of this soil are slightly elongated or are long and winding. They range from 2 to 30 acres or more in size.

Typically, the surface layer is pale brown gravelly sandy loam about 10 inches thick. The subsoil is mostly strong brown and yellowish red gravelly sandy loam and gravelly sandy clay loam about 41 inches thick. The substratum, to a depth of 60 inches or more, is yellowish brown and reddish yellow gravelly sandy clay loam.

Included with this soil in mapping are small areas of well drained and moderately well drained Dystrochrepts and Udults, which are mainly on the lower part of the slopes, and poorly drained Fluvaquents, which are along drainageways and small streams. Also included are small areas of severely eroded soils that have a brownish yellow gravelly sandy loam surface layer and a few areas where small gullies have formed. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is rapid. Erosion is a very severe hazard. The surface layer is friable and can be easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

This soil is poorly suited to cultivated crops. The soil is somewhat droughty during the growing season because of the rapid surface runoff, and crop response to lime and fertilizer is somewhat limited because of the lack of moisture. Minimum tillage, terraces, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, sweetgum, and upland oaks grow well on this soil. Logging roads and skid trails should be laid out on the contour to reduce concentrated runoff and control erosion. Slope limits the safe operation of heavy equipment.

Slope limits the use of this soil as sites for buildings, sanitary landfills, recreation areas, and septic tank absorption fields.

The capability subclass is IVe.

26C—LaRoque loam, 7 to 15 percent slopes. This is a moderately deep, sloping, well drained soil on convex ridgetops, points of ridges, and side slopes. The areas of this soil are irregularly rounded or are long and winding. They range from 2 to about 20 acres or more in size.

Typically, the surface layer is dark grayish brown loam about 2 inches thick. The subsurface layer is light yellowish brown loam about 5 inches thick. The subsoil is reddish yellow loam about 7 inches thick. The substratum is mostly yellowish brown loam about 20 inches thick. Weathered rock is at a depth of about 34 inches.

Included with this soil in mapping are small areas of well drained Brockroad, Nason, and Tatum soils, moderately well drained Margo soils, and poorly drained Toddstav soils. Brockroad, Nason, and Tatum soils are mostly on ridges. Margo and Toddstav soils are in saddles, on the lower part of slopes, and along drainageways. The included soils make up about 25 percent of the map unit.

Permeability is moderate, and the available water capacity is low. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to weathered bedrock, which is at a depth of 20 to 40 inches. The organic matter content and natural fertility are low. The soil is strongly acid to extremely acid throughout except in areas that have been limed.

This soil is poorly suited to cultivated crops. It is droughty during the growing season, and crop response to lime and fertilizer is limited because of the low available water capacity. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, reduce runoff, control erosion, and increase water infiltration.

This soil is poorly suited to hay and pasture. The growth of grasses and shrubs is limited by the low available water capacity. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderate, especially for loblolly pine and eastern white pine. Seeds and seedlings are affected by drought during the growing season.

Depth to bedrock and slope limit the use of the soil as sites for buildings, septic tank absorption fields, and sanitary landfills. Depth to bedrock limits excavation.

The capability subclass is IVe.

26D—LaRoque loam, 15 to 25 percent slopes. This is a moderately deep, moderately steep, well drained soil on side slopes and points of ridges. The areas of this soil commonly are long and winding. They range in size from 2 to about 20 acres or more.

Typically, the surface layer is dark grayish brown loam about 2 inches thick. The subsurface layer is light yellowish brown loam about 5 inches thick. The subsoil is reddish yellow loam about 7 inches thick. The substratum is mostly yellowish brown loam about 20 inches thick. Weathered rock is at a depth of about 34 inches.

Included with this soil in mapping are small areas of well drained Brockroad, Nason, and Tatum soils, poorly drained Fluvaquents, and moderately well drained Margo soils. The areas of Brockroad, Nason, and Tatum soils are scattered throughout the map unit. Fluvaquents are along drainageways and small streams. Margo soils are on the lower part of slopes and along drainageways. Also included are small areas of soils that have a gravelly surface layer and small areas of rock outcrop. The included areas make up about 25 percent of the map unit.

Permeability is moderate, and the available water capacity is low. Surface runoff is rapid. Erosion is a very severe hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to weathered bedrock, which is at a depth of 20 to 40 inches. The organic matter content and natural fertility are low. The soil is strongly acid to extremely acid throughout except in areas that have been limed.

This soil is not suited to cultivated crops and is poorly suited to hay and pasture. The soil is droughty during the growing season. Plant response to lime and fertilizer is limited because of the low available water capacity. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderate, especially for loblolly pine and eastern white pine. Seeds and seedlings are affected by drought during the growing season. Logging roads and skid trails should be laid out on the contour to reduce concentrated runoff and help control erosion. The steepness of the slope limits the safe operation of equipment.

Depth to bedrock and slope limit the use of the soil as sites for buildings, septic tank absorption fields, and sanitary landfills. Depth to bedrock and slope also limit excavation.

The capability subclass is VIe.

26E—LaRoque loam, 25 to 55 percent slopes. This is a moderately deep, steep, well drained soil on side slopes. The areas of this soil are slightly elongated or are long and winding. They range in size from 2 to about 30 acres or more.

Typically, the surface layer is dark grayish brown loam about 2 inches thick. The subsurface layer is light

yellowish brown loam about 6 inches thick. The subsoil is reddish yellow loam about 7 inches thick. The substratum is mostly yellowish brown loam about 20 inches thick. Weathered rock is at a depth of about 34 inches.

Included with this soil in mapping are small areas of poorly drained Fluvaquents and Toddstav soils, moderately well drained Margo soils, and well drained Nason and Tatum soils. Fluvaquents are along drainageways and small streams. Margo and Toddstav soils are on the lower part of slopes and along drainageways. Nason and Tatum soils commonly are on the upper part of slopes. The included soils make up about 25 percent of the map unit.

Permeability is moderate, and the available water capacity is low. Surface runoff is rapid. Erosion is a very severe hazard. The subsoil has a low shrink-swell potential. The root zone extends to weathered bedrock, which is at a depth of 20 to 40 inches. The organic matter content and natural fertility are low. The soil is strongly acid to extremely acid throughout.

This soil is not suited to cultivated crops and is poorly suited to pasture. The soil is droughty during the growing season; consequently, the growth of grasses and shrubs is affected. Maintaining a mixture of grasses and legumes, proper stocking, and rotation and deferred grazing help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderate, especially for loblolly pine and eastern white pine. Seeds and seedlings are affected by drought during the growing season. Logging roads and skid trails should be laid out on the contour to reduce runoff and help control erosion. The steepness of the slope limits the safe operation of equipment.

Slope limits the use of the soil as sites for buildings, septic tank absorption fields, and sanitary landfills. Slope and depth to bedrock limit excavation.

The capability subclass is VIIe.

27C—Louisburg sandy loam, 7 to 15 percent slopes. This is a moderately deep, sloping, well drained soil on convex ridgetops, points of ridges, and side slopes. The areas of this soil are slightly elongated or are long and winding. They range in size from 2 to about 20 acres or more.

Typically, the surface layer is grayish brown sandy loam about 1 inch thick. The subsurface layer is pale brown sandy loam about 10 inches thick. The subsoil is strong brown sandy clay loam about 7 inches thick. The substratum is mostly strong brown and reddish yellow sandy loam about 9 inches thick. Partly weathered bedrock is at a depth of about 27 inches.

Included with this soil in mapping are small areas of well drained Appling, Cecil, and Pacolet soils, moderately well drained Margo soils, and poorly drained Toddstav soils. Appling, Cecil, and Pacolet soils are mostly on ridges. Margo and Toddstav soils are in saddles, on the lower part of slopes, and along drainageways. Also included are small areas where the depth to bedrock is less than 20 inches. The included areas make up about 25 percent of the map unit.

Permeability is rapid, and the available water capacity is low. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to the partly weathered bedrock, which is at a depth of 20 to 48 inches. The organic matter content and natural fertility are low. The soil is strongly acid to very strongly acid throughout, except in areas that have been limed.

This soil is poorly suited to cultivated crops. It is droughty during the growing season, and crop response to lime and fertilizer is limited because of the low available water capacity. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, reduce runoff, control erosion, and increase water infiltration.

This soil is poorly suited to hay and pasture. The growth of grasses and shrubs is limited by the low available water capacity. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderately high, especially for loblolly pine and yellow-poplar. Seeds and seedlings are affected by drought during the growing season.

Slope and depth to bedrock limit the use of the soil as sites for buildings, septic tank absorption fields, and sanitary landfills. Depth to bedrock limits excavation.

The capability subclass is IVe.

27D—Louisburg sandy loam, 15 to 25 percent slopes. This is a moderately deep, moderately steep, well drained soil on convex ridgetops, points of ridges, and side slopes. The areas of this soil are slightly elongated or are long and winding. They range in size from 2 to about 20 acres or more.

Typically, the surface layer is grayish brown sandy loam about 1 inch thick. The subsurface layer is pale brown sandy loam about 10 inches thick. The subsoil is strong brown sandy clay loam about 7 inches thick. The substratum is mostly strong brown and reddish yellow sandy loam about 9 inches thick. Partly weathered bedrock is at a depth of about 27 inches.

Included with this soil in mapping are small areas of well drained Appling, Cecil, and Pacolet soils, moderately well drained Margo soils, and poorly drained Toddstav soils. Appling, Cecil, and Pacolet soils are mostly on ridges. Margo and Toddstav soils are in saddles, on the lower part of slopes, and along drainageways. Also included are small areas where the depth to bedrock is less than 20 inches. The included areas make up about 25 percent of the map unit.

Permeability is moderate, and the available water capacity is low. Surface runoff is rapid. Erosion is a very severe hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to the partly weathered bedrock, which is at a depth of 20 to 48 inches. The organic matter content and natural fertility are low. The soil is strongly acid to very strongly acid throughout except in areas that have been limed.

This soil is poorly suited to cultivated crops, pasture, and hay. The low available water capacity limits the growth of grasses and shrubs. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited because of the low available water capacity. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderate, especially for loblolly pine and yellow-poplar. Seeds and seedlings are affected by drought during the growing season. Logging roads and skid trails should be laid out on the contour to reduce runoff and help control erosion. The steepness of the slope limits the safe operation of equipment.

Slope and depth to bedrock limit the use of the soil as sites for buildings, septic tank absorption fields, and sanitary landfills. Slope and depth to bedrock also limit excavation.

The capability subclass is VIe.

27E—Louisburg sandy loam, 25 to 50 percent slopes. This is a moderately deep, steep and very steep, well drained soil on points of ridges and side slopes. The areas of this soil are slightly elongated or are long and winding. They range in size from 2 to about 20 acres or more.

Typically, the surface layer is grayish brown sandy loam about 1 inch thick. The subsurface layer is pale brown sandy loam about 10 inches thick. The subsoil is strong brown sandy clay loam about 7 inches thick. The substratum is mostly strong brown and reddish yellow sandy loam about 9 inches thick. Partly weathered bedrock is at a depth of about 27 inches.

Included with this soil in mapping are small areas of well drained Appling, Cecil, and Pacolet soils, moderately well drained Margo soils, and poorly drained Toddstav soils. Appling, Cecil, and Pacolet soils are mainly on ridges. Margo and Toddstav soils are in saddles, on the lower part of slopes, and along drainageways. Also included are small areas where the depth to bedrock is less than 20 inches. The included areas make up about 25 percent of the map unit.

Permeability is moderate, and the available water capacity is low. Surface runoff is rapid to very rapid. Erosion is a very severe hazard. The subsoil has a low shrink-swell potential. The root zone extends to the partly weathered bedrock, which is at a depth of 20 to 48 inches. The organic matter content and natural fertility are low. The soil is strongly acid to very strongly acid throughout.

The soil is poorly suited to cultivated crops, hay, and pasture. The low available moisture capacity limits the growth of grasses and shrubs. The soil is droughty during the growing season. Maintaining a mixture of grasses and legumes, proper stocking, and rotation and deferred grazing help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderately high, especially for loblolly pine and upland oaks. Seeds and seedlings are affected by drought during the growing season. Logging roads and skid trails should be laid out on the contour to reduce concentrated runoff and help control erosion. The steep slopes limit the safe operation of equipment.

The steep slopes limit the use of the soil as sites for buildings, septic tank absorption fields, and sanitary landfills. The slopes and depth to bedrock limit excavation.

The capability subclass is VIIe.

28B—Margo loam, 2 to 7 percent slopes. This is a deep, nearly level, moderately well drained soil on toe slopes, in depressions, and along drainageways. Most areas of this soil are concave and are long and winding. They range in size from 2 to 15 acres.

Typically, the surface layer is very dark grayish brown loam about 1 inch thick. The subsurface layer is light yellowish brown loam about 8 inches thick. The subsoil is mostly yellowish brown and light olive brown clay loam about 36 inches thick. There are gray mottles below a depth of about 17 inches. The substratum, to a depth of 60 inches or more, is brownish yellow sandy loam that has gray mottles.

Included with this soil in mapping are small areas of well drained LaRoque, Nason, and Tatum soils and poorly drained Toddstav soils. LaRoque soils are in higher areas, mainly close to uplands. Nason and Tatum soils are in higher areas scattered throughout the map

unit. Toddstav soils are at the head of drainageways and along drainageways. Also included are areas of soils that have a gravelly loam surface layer. The included areas make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content is moderate, and natural fertility is low. The soil commonly is strongly acid to extremely acid throughout except in areas that have been limed. The soil is frequently flooded for very brief periods during spring and early in summer. A seasonal high water table is at a depth of 1 foot to 3 feet during winter and early in spring.

This soil is used mainly as woodland. In some areas it is used as cropland, and in a few areas it is in pasture.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. The soil is wet and cold early in spring, and wetness often delays early tillage. Crops are often damaged by very brief flooding during spring and early in summer. Drainage and flood control help alleviate wetness in spring and reduce crop damage. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, reduce crusting and erosion, and increase water infiltration.

This soil is well suited to hay and pasture. Alfalfa is often short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and damages stands of grasses and legumes.

The potential productivity of this soil for trees is high, especially for loblolly pine and yellow-poplar. Seeds and seedlings survive and grow well. The use of heavy equipment is limited during wet periods.

The seasonal high water table and the hazard of flooding limit the use of the soil as sites for buildings, sanitary landfills, and septic tank absorption fields. A suitable base material is necessary to provide strength and stability to the soil if it is used for roads.

The capability subclass is IIw.

29B—Masada loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on old river terraces that are higher than the flood plains and at some distance from them. The areas of this soil commonly are irregularly rounded or elongated. They range in size from 2 to about 20 acres or more.

Typically, the surface layer is dark yellowish brown loam about 10 inches thick. The subsoil is mostly strong brown clay about 52 inches thick. The substratum is mostly strong brown clay loam, to a depth of 75 inches or more.

Included with this soil in mapping are small, scattered areas of well drained Appling, Cecil, Nason, Tatum, and Turbeville soils. Also included are small areas of soils that have a gravelly loam surface layer and severely eroded soils that have a yellowish brown clay loam surface layer. The included soils make up about 15 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

In many areas this soil is used as cropland. Some of the acreage is used as woodland, and some is used for urban development.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil.

The moderate shrink-swell potential limits the use of the soil as sites for buildings and the clayey subsoil limits excavation. Low strength is a limitation for roads. The moderate permeability of the subsoil limits the use of this soil for septic tank absorption fields.

The capability subclass is IIe.

29C2—Masada loam, 7 to 15 percent slopes, eroded. This is a deep, sloping, well drained soil on old river terraces that are higher than the flood plains and at some distance from them. The areas of this soil commonly are irregular in shape and follow the contour of the landscape. They range in size from 2 to about 15 acres.

Typically, the surface layer is dark yellowish brown loam about 6 inches thick. The subsoil is mostly strong brown clay about 48 inches thick. The substratum, to a depth of 70 inches or more, is mostly strong brown clay.

Included with this soil in mapping are small, scattered areas of well drained Appling, Cecil, Nason, Tatum, and Turbeville soils. Also included are soils that have a gravelly loam surface layer and severely eroded soils that have a yellowish brown or strong brown clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed.

In many areas this soil is used for cultivated crops. Some of the acreage is used as woodland, and some is used for urban development.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high, especially for loblolly pine, yellow-poplar, and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope and the moderate shrink-swell potential limit the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. Slope and the moderate permeability of the subsoil are limitations for septic tank absorption fields and recreation areas.

The capability subclass is IIIe.

30B—Mattaponi sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, moderately well drained soil on narrow to broad, convex ridgetops. The areas of this soil commonly are irregularly rounded or oval. They range in size from 2 to about 20 acres or more.

Typically, the surface layer is brown sandy loam about 10 inches thick. The subsoil is mostly reddish yellow, yellowish brown, and brownish yellow clay about 34 inches thick. The substratum is mostly yellowish brown and brownish yellow clay or sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small, scattered areas of well drained Faceville and Kempsville soils and moderately well drained Savannah soils. Also included are soils that have a gravelly sandy loam surface layer and severely eroded soils that have a yellowish brown sandy clay loam or clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderately slow, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is very strongly acid throughout except in areas that have been limed. A perched seasonal high water table is at a depth of 3 to 6 feet during winter and early in spring.

In most areas this soil is used as woodland. Some of the acreage is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil.

The moderate shrink-swell potential limits the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of the soil for roads. The moderate permeability of the subsoil limits the use of the soil for septic tank absorption fields.

The capability subclass is IIe.

31C2—Mattaponi sandy clay loam, 7 to 15 percent slopes, eroded. This is a deep, sloping, moderately well drained soil on narrow convex ridgetops, points of ridges, and convex side slopes. The areas of this soil commonly are irregularly rounded or are long and winding. They range in size from 2 to about 10 acres.

Typically, the surface layer is brown sandy clay loam about 8 inches thick. The subsoil is mostly reddish yellow, yellowish brown, and brownish yellow clay about 36 inches thick. The substratum, to a depth of 60 inches or more, is mostly yellowish brown and brownish yellow clay and sandy loam.

Included with this soil in mapping are small, scattered areas of well drained Faceville and Kempsville soils and

moderately well drained Savannah soils. Also included are soils that have a gravelly sandy clay loam surface layer and severely eroded soils that have a yellowish brown clay loam or clay surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderately slow, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid throughout except in areas that have been limed. A perched seasonal high water table is at a depth of 3 to 6 feet during winter and early in spring.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderately high, especially for loblolly pine and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope and the moderate shrink-swell potential limit the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. Slope and the moderately slow permeability of the subsoil limit the use of the soil for septic tank absorption fields and recreation areas.

The capability subclass is IIIe.

32B—Nason silt loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on convex ridgetops. The areas of this soil commonly are irregularly round or oblong. They range in size from 2 to about 20 acres or more.

Typically, the surface layer is dark gray silt loam about 2 inches thick. The subsurface layer is yellowish brown silt loam about 5 inches thick. The subsoil is yellowish brown and strong brown silty clay loam and clay about 28 inches thick. The substratum to a depth of 60 inches or more is strong brown, brownish yellow, red, and white weathered rock that crushes to loam or silt loam.

Included with this soil in mapping are small areas of well drained Brockroad, Catharpin, and LaRoque soils. Brockroad and Catharpin soils are mainly on the crests and points of ridges. LaRoque soils are mainly on the lower part of slopes. Also included are soils that have a gravelly silt loam surface layer and severely eroded soils that have a yellowish brown silty clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland. Some of the acreage is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if the competing vegetation is controlled. Loblolly pine and eastern white pine grow well on this soil.

The moderate shrink-swell potential limits the use of this soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. The moderate permeability of the subsoil limits the use of the soil for septic tank absorption fields. The permeability of the substratum, however, commonly is not a limiting factor for septic tank absorption fields. In some places the depth to hard bedrock limits the deep installation of absorption fields.

The capability subclass is IIe.

32C2—Nason silt loam, 7 to 15 percent slopes, eroded. This is a deep, sloping, well drained soil on convex ridgetops, points of ridges, and narrow convex side slopes. The areas of this soil commonly are long and winding. They range in size from 2 to 20 acres or more.

Typically, the surface layer is dark gray silt loam about 2 inches thick. The subsurface layer is yellowish brown silt loam about 5 inches thick. The subsoil is mostly yellowish brown and strong brown silty clay loam and clay about 28 inches thick. The substratum, to a depth of

60 inches or more, is mostly strong brown, brownish yellow, red, and white weathered rock that crushes to loam or silt loam.

Included with this unit in mapping are small areas of poorly drained Fluvaquents and Partlow soils and well drained LaRoque and Tatum soils. Fluvaquents and Partlow soils are along drainageways and small streams. LaRoque soils are mostly on the lower part of slopes. Tatum soils are scattered throughout the map unit. Also included are soils that have a gravelly silt loam surface layer and severely eroded soils that have a yellowish brown silty clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland, and a few areas are in pasture.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high, especially for loblolly pine and eastern white pine. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope and the moderate shrink-swell potential limit the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. Slope and the moderate permeability rate limit the use of the soil for septic tank absorption fields and recreation areas. The permeability of the substratum commonly is not a limiting factor for septic tank absorption fields. In some places the depth to hard bedrock limits the deep installation of absorption fields.

The capability subclass is IIIe.

32D2—Nason silt loam, 15 to 25 percent slopes, eroded. This is a deep, moderately steep, well drained soil on convex side slopes. The areas of this soil are slightly elongated or are long and winding. They range in size from 2 to 10 acres or more.

Typically, the surface layer is yellowish brown silt loam about 5 inches thick. The subsoil is mostly yellowish brown and strong brown silty clay loam and clay about 26 inches thick. The substratum, to a depth of 60 inches or more, is strong brown, brownish yellow, red, and white weathered rock that crushes easily to loam or silt loam.

Included with this soil in mapping are small areas of poorly drained Fluvaquents and well drained LaRoque and Tatum soils. Fluvaquents are along drainageways and small streams. LaRoque soils are mainly on the lower part of slopes. Tatum soils are mainly on the upper part of slopes. Also included are small areas of soils that have a gravelly silt loam surface layer, areas of severely eroded soils that have a yellowish brown silty clay loam surface layer, and small areas of gullied soils that are mainly on the lower part of slopes. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is rapid. Erosion is a very severe hazard. The surface layer is moderately friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

This soil is poorly suited to cultivated crops. It is somewhat droughty during the growing season because of the rapid surface runoff, and crop response to lime and fertilizer is somewhat limited because of this lack of moisture. Minimum tillage, terraces, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and eastern white pine are especially suited to this soil. Logging roads and skid trails should be laid out on the contour to reduce concentrated runoff and help control erosion. Slope limits the safe operation of heavy equipment.

Slope limits the use of the soil as sites for buildings, septic tank absorption fields, and recreation areas. Slope and the clayey subsoil limit the use of the soil for sanitary landfills. Low strength limits its use for roads.

The capability subclass is IVe.

33B—Orange-Iredell loams, 2 to 7 percent slopes. The soils making up this complex are deep, gently sloping, and somewhat poorly drained to moderately well drained. They are on broad convex ridgetops. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas are elongated, irregularly rectangular, or irregularly oval and range in size from 2 to about 20 acres or more. The complex consists of about 55 percent Orange loam, 30 percent Iredell loam, and 15 percent other soils.

Typically, the surface layer of the Orange soil is grayish brown loam about 6 inches thick. The subsoil, which extends to a depth of 43 inches, is gray mottled, yellowish brown and light olive brown clay. The substratum is gray mottled, light olive brown sandy clay loam.

Typically, the surface layer of the Iredell soil is brown loam about 5 inches thick. The subsoil is mostly yellowish brown clay about 25 inches thick. It has gray mottles below a depth of about 22 inches. The substratum, to a depth of 60 inches or more, is green, gray, yellowish brown, and white loam.

The other soils included in this complex are the well drained Cullen, Fluvanna, and Poindexter soils. Areas of these soils are scattered throughout the complex. Also included are small areas of severely eroded soils that have a yellowish brown clay loam or clay surface layer and areas of soils that have a gravelly loam surface layer.

Permeability of the soils making up this complex is slow, and the available water capacity is moderate. Surface runoff is medium. Erosion is a severe hazard. The surface layer of these soils is friable and can be easily tilled. The shrink-swell potential of the Orange soil is high, and that of the Iredell soil is very high. The root zone extends to a depth of 60 inches or more, but it is somewhat limited by the clayey subsoil. The organic matter content is low, and the natural fertility is medium. The soils commonly are medium acid to moderately alkaline except in areas that have been limed. A seasonal high water table is at a depth of 1 foot to 3 feet during winter and spring.

The soils are used mainly as woodland. In some areas they are used as cropland, and some areas are in pasture.

These soils are poorly suited to cultivated crops. Crop response to lime and fertilizer is somewhat limited. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

These soils are poorly suited to hay and pasture. Alfalfa is short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of the soils for trees is moderate. Loblolly pine and shortleaf pine grow moderately well on these soils. Seeds and seedlings grow well if competing vegetation is controlled.

The seasonal high water table limits the use of these soils for sanitary landfills. The high or very high shrink-swell potential limits the use of the soils as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of the soils for roads. The slow permeability of the subsoil limits the use of these soils for septic tank absorption fields. Slope limits their use as playgrounds.

The capbability subclass is IIIe.

33C2—Orange-Iredell loams, 7 to 15 percent slopes, eroded. The soils making up this complex are deep, gently sloping, and somewhat poorly drained to moderately well drained. They are on side slopes. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas are oval or are long and narrow. They range in size from 2 to about 10 acres or more. The complex consists of about 55 percent Orange loam, 30 percent Iredell loam, and 15 percent other soils.

Typically, the surface layer of the Orange soil is grayish brown loam about 5 inches thick. The subsoil extends to a depth of 35 inches. It is gray mottled, yellowish brown and light olive brown clay. The substratum is gray mottled, light olive brown sandy clay loam.

Typically, the surface layer of the Iredell soil is brown loam about 5 inches thick. The subsoil is mostly yellowish brown clay about 25 inches thick. It has gray mottles below a depth of about 21 inches. The substratum is green, gray, yellowish brown, and white loam.

The other soils included in this complex are the well drained Cullen, Fluvanna, and Poindexter soils. Areas of these soils are scattered throughout the complex. Also included are small areas of severely eroded soils that have a yellowish brown clay loam or clay surface layer and areas of soils that have a gravelly loam surface layer.

Permeability of the soils making up this complex is slow, and the available water capacity is moderate. Surface runoff is medium. Erosion is a very severe hazard. The surface layer of these soils is friable and can be easily tilled. The shrink-swell potential of the Orange soil is high, and that of the Iredell soil is very high. The root zone extends to a depth of 60 inches or more, but it is somewhat limited by the clayey subsoil. The organic matter content and natural fertility are low. The soils commonly are medium acid to moderately

alkaline except in areas that have been limed. A seasonal high water table is at a depth of 1 foot to 3 feet during winter and spring.

The soils are used mainly as woodland. In some areas they are used as cropland, and some areas are used for urban development.

These soils are poorly suited to cultivated crops. Crop response to lime and fertilizer is limited. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

These soils are poorly suited to hay and pasture. Alfalfa is short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of the soils for trees is moderate. Loblolly pine and shortleaf pine grow moderately well on these soils. Seeds and seedlings grow well if competing vegetation is controlled.

The seasonal high water table limits the use of these soils for sanitary landfills. Slope and the high or very high shrink-swell potential limit their use as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of these soils for roads. The slow permeability of the subsoil and the slope limit the use of the soils for septic tank absorption fields. Slope limits their use as playgrounds.

The capability subclass is VIe.

34B—Partlow sandy loam, 0 to 7 percent slopes. This is a deep, nearly level and gently sloping, poorly drained soil in depressions, on toe slopes, and along drainageways. The areas of this soil are irregularly rounded or are long and narrow and commonly are slightly concave. They range in size from 2 to more than 20 acres.

Typically, the surface layer is very dark grayish brown sandy loam about 2 inches thick. The subsurface layer is light brownish gray sandy loam about 12 inches thick. The subsoil, which extends to a depth of 55 inches, is mostly light gray sandy clay loam that is mottled with brighter colors. The substratum, to a depth of 70 inches or more, is light gray sandy loam.

Included with this soil in mapping are small areas of moderately well drained Abell soils and somewhat poorly drained to moderately well drained Colfax soils. These soils are in slightly higher, oval or long narrow areas scattered throughout the map unit. Also included are soils that have a compact, brittle layer in the subsoil and soils that have a clayey overwash on the surface. The included soils make up about 20 percent of the map unit.

Permeability is slow to moderate, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil commonly is strongly acid or very strongly acid throughout except in areas that have been limed. In many areas the soil dries slowly in spring and after heavy rains. It is ponded in some areas. A seasonal high water table is between the surface and a depth of 1 foot during winter and spring. The soil is frequently flooded for brief periods during winter and spring and after heavy rains.

If the soil is drained and protected from flooding, it is moderately well suited to cultivated crops. Open ditch drains are more suitable than tile drains. Outlets are very difficult to locate. The soil is wet and cold in spring, and wetness may delay tillage. If the soil is not drained, cultivated crops cannot be grown in most years.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, drainage, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and damages stands of grasses and legumes.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderately high, especially for loblolly pine and willow oak. Seeds and seedlings survive and grow well if competing vegetation is controlled. The use of heavy equipment is limited during wet periods.

The seasonal high water table and the hazard of flooding limit the use of the soil as sites for sanitary landfills, buildings, and septic tank absorption fields. A suitable base material is necessary to provide strength to the soil if it is used for roads.

The capability subclass is Vw.

35C—Poindexter loam, 7 to 15 percent slopes. This is a moderately deep, sloping, well drained soil on narrow convex ridgetops, points of ridges, and side slopes. The areas of this soil are slightly elongated or are long and winding. They range in size from 2 to about 15 acres.

Typically, the surface layer is light olive brown loam about 6 inches thick. The subsoil is yellowish brown and strong brown sandy clay loam about 9 inches thick. The substratum extends to a depth of 45 inches. It is strong brown, olive brown, and brownish yellow sandy clay loam in the upper part and strongly weathered rock that crushes to loam and sandy loam in the lower part. Bedrock is at a depth of about 45 inches.

Included with this soil in mapping are small areas of well drained Cullen and Fluvanna soils and somewhat poorly drained to moderately well drained Iredell and

Orange soils. Areas of these soils are on ridges and side slopes and are scattered throughout the map unit. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is low. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 27 inches. The organic matter content and natural fertility are low. The soil is very strongly acid to neutral except in areas that have been limed. The depth to partly weathered rock is 20 to 40 inches, and the depth to hard rock is 40 to 60 inches.

This soil is poorly suited to cultivated crops. It is droughty during the growing season, and crop response to lime and fertilizer is limited because of the low available water capacity. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, and increase water infiltration.

This soil is poorly suited to hay and pasture. The growth of grasses and shrubs is limited by the low available water capacity. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderate. Loblolly pine and upland oaks grow moderately well on this soil. Seeds and seedlings are affected by drought during the growing season.

Depth to bedrock and slope limit the use of the soil as sites for buildings, septic tank absorption fields, and sanitary landfills. Depth to bedrock limits excavation.

The capability subclass is IVe.

35D—Poindexter loam, 15 to 25 percent slopes. This is a deep, moderately steep, well drained soil on side slopes. The areas of this soil are elongated or are long and winding. They range in size from 2 to 15 acres.

Typically, the surface layer is very dark grayish brown loam about 1 inch thick. The subsurface layer is light olive brown loam about 5 inches thick. The subsoil is mostly yellowish brown and strong brown loam and clay loam about 9 inches thick. The substratum, which extends to a depth of about 45 inches, is strong brown, olive brown, and brownish yellow sandy clay loam in the upper part and strongly weathered rock that crushes easily to loam and sandy loam in the lower part. Bedrock is at a depth of about 45 inches.

Included with this soil in mapping are small, scattered areas of well drained Cullen, Fluvanna, and Louisburg soils and small areas of poorly drained Fluvaquents and Partlow soils along drainageways. Also included are areas of rock outcrop mainly on the lower part of slopes, small areas of gullied soils, and small areas of soils that have a gravelly loam surface layer. The included areas make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is low. Surface runoff is rapid. Erosion is a very severe hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 27 inches. The organic matter content is low, and natural fertility is medium. The soil is very strongly acid to neutral throughout except in areas that have been limed. The depth to partly weathered rock is 20 to 40 inches, and the depth to hard rock is 40 to 60 inches.

This soil is not suited to cultivated crops, and it is moderately well suited to pasture and hay. The soil is droughty during the growing season because of the rapid surface runoff and low available water capacity. Plant response to lime and fertilizer is limited because of this lack of moisture. Maintaining a mixture of grasses and legumes, proper stocking, and rotation and deferred grazing help increase the carrying capacity of the pasture and control erosion. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderate. Seeds and seedlings are affected by droughtiness during the growing season. Loblolly pine and shortleaf pine grow moderately well on this soil. Logging roads and skid trails should be laid out on the contour to reduce runoff and help control erosion. Slope limits the safe operation of heavy equipment.

Slope and depth to bedrock limit the use of the soil as sites for buildings, septic tank absorption fields, and sanitary landfills. They also limit the soil for most types of recreation uses.

The capability subclass is VIe.

35E—Poindexter loam, 25 to 60 percent slopes. This is a moderately deep, steep, well drained soil on convex side slopes. The areas of this soil commonly are long and winding. They range in size from 2 to about 15 acres.

Typically, the surface layer is light olive brown loam about 6 inches thick. The subsoil is mostly yellowish brown and strong brown loam and sandy clay loam about 9 inches thick. The substratum is strongly weathered rock that crushes to loam and sandy loam. Bedrock is at a depth of about 45 inches.

Included with this soil in mapping are small areas of poorly drained Fluvaquents and well drained Louisburg soils. Fluvaquents are along drainageways and small streams. Areas of Louisburg soils are scattered throughout the map unit. Also included are small areas of soils that have a gravelly loam surface layer, areas of severely eroded soils that have a yellowish brown loam or clay loam surface layer, areas where bedrock is at a

depth of less than 20 inches, areas of rock outcrop, and areas of gullied soils. The included areas make up about 25 percent of the map unit.

Permeability is moderate, and the available water capacity is low. Surface runoff is rapid. Erosion is a very severe hazard. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 27 inches. The organic matter content and natural fertility are low. The soil is very strongly acid to neutral throughout. The depth to partly weathered rock is 20 to 40 inches, and the depth to hard rock is 40 to 60 inches.

This soil is not suited to cultivated crops, and it is poorly suited to pasture. It is droughty during the growing season. Maintaining a mixture of grasses and legumes, proper stocking, and rotation and deferred grazing help increase the carrying capacity of the pasture and help control erosion. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderate. Loblolly pine and shortleaf pine grow moderately well on this soil. Seeds and seedlings are affected by drought during the growing season, and seedling loss can exceed 50 percent. Logging roads and skid trails should be laid out on the contour to reduce runoff and help control erosion. The steep slopes limit the safe operation of equipment. The limited depth to bedrock makes windthrow a hazard in some places.

The steep slopes limit the use of this soil as sites for buildings, septic tank absorption fields, and sanitary landfills and as recreation areas.

The capability subclass is VIIe.

36A—Savannah sandy loam, 0 to 2 percent slopes. This is a deep, nearly level, moderately well drained soil on broad ridgetops. The ridges are about 400 to 1,600 feet wide. The areas of this soil are elongated or irregularly rectangular. They range in size from 2 to about 40 acres or more.

Typically, the surface layer is dark grayish brown sandy loam about 11 inches thick. The upper part of the subsoil is yellowish brown and brownish yellow sandy clay loam about 11 inches thick. The middle part is a fragipan—a brittle compact layer of fine sandy loam and sandy clay loam about 17 inches thick. The lower part of the subsoil is strong brown clay loam to a depth of 64 inches. The substratum is mottled red, yellow, and gray clay loam to a depth of 79 inches or more.

Included with this soil in mapping are small areas of well drained Faceville soils, moderately well drained Goldsboro soils, and poorly drained Partlow soils. Areas of Faceville soils are scattered throughout the map unit. Goldsboro are on small upland flats. Partlow soils are on toe slopes and along small drainageways. Also included are small areas of soils that have small amounts of gravel in the surface layer and subsoil and areas of soils that have a thinner surface layer and subsoil and are underlain by saprolite. The included soils make up about 20 percent of the map unit.

Permeability is moderate in the upper 22 inches of the soil and is slow in the fragipan. The available water capacity is low. Surface runoff is slow. Erosion is a slight hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 22 inches, below which root growth is severely restricted by the fragipan. The organic matter content and natural fertility are low. The surface layer and subsoil commonly are strongly acid or very strongly acid except in areas that have been limed. In many areas the soil dries slowly in spring and after heavy rains. There is a perched water table during the winter and early in spring.

In many areas this soil is used for cultivated crops. In some areas it is used as woodland, and in some areas it is in pasture.

This soil is moderately well suited to cultivated crops. Deep-rooted crops commonly are stunted or short-lived because of wetness and the restricted rooting depth. The soil is droughty during the growing season. Crop response to lime and fertilizer is limited because of the low available water capacity. Minimum tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and eastern white pine grow moderately well on this soil. The use of heavy equipment is limited during wet periods. Windthrow is a hazard when the soil is wet because of the shallow rooting depth.

The seasonal high water table limits the use of the soil for sanitary landfills. The moderate or slow permeability of the subsoil limits the use of the soil for septic tank absorption fields. A suitable base material is necessary to provide strength to the soil if it is used for roads.

The capability subclass is IIw.

36B—Savannah sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, moderately well drained soil on broad convex ridgetops. The ridges are about 400 to 1,600 feet wide. The areas of this soil are elongated or irregularly rectangular. They range in size from 2 to about 40 acres or more.

Typically, the surface layer is dark grayish brown sandy loam about 11 inches thick. The upper part of the subsoil is yellowish brown and brownish yellow sandy clay loam about 11 inches thick. The middle part is a fragipan—a brittle compact layer of sandy loam and sandy clay loam about 17 inches thick. The lower part of the subsoil is strong brown clay loam to a depth of 64 inches. The substratum is mottled red, yellow, and gray clay loam to a depth of 79 inches or more.

Included with this soil in mapping are small areas of well drained Faceville soils, moderately well drained Goldsboro soils, and poorly drained Partlow soils. Areas of Faceville soils are scattered throughout the map unit. Goldsboro soils are on small upland flats. Partlow soils are on toe slopes and along small drainageways. Also included are sloping soils, soils that have small amounts of gravel in the surface layer and subsoil, and soils that have a thinner surface layer and subsoil and are underlain by saprolite. The included soils make up about 20 percent of the map unit.

Permeability is moderate in the upper 22 inches of the soil and is slow in the fragipan. The available water capacity is low. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 22 inches, below which root growth is severely restricted by the fragipan. The organic matter content and natural fertility are low. The surface layer and subsoil commonly are strongly acid or very strongly acid except in areas that have been limed. In many areas the soils dry slowly in spring and after heavy rains. There is a perched water table above the fragipan during the winter and early in spring.

In many areas this soil is used as cropland. In some areas it is used as woodland, and in some areas it is in pasture.

This soil is moderately well suited to cultivated crops. Deep-rooted crops commonly are stunted or short-lived because of wetness and the restricted rooting depth. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited because of the low available water capacity. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is moderately well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and eastern white pine grow moderately well on this soil. The use of heavy equipment is limited during wet periods. Windthrow is a hazard when the soil is wet because of the shallow rooting depth.

The perched water table limits the use of this soil for sanitary landfills. The moderate or slow permeability of the subsoil limits the use of this soil for septic tank absorption fields. A suitable base material is necessary to provide strength to the soil if it is used for roads.

The capability subclass is IIe.

37B—Spotsylvania fine sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on convex ridgetops. The areas of this soil commonly are irregularly rounded or oblong. They range in size from 2 to about 30 acres or more.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is light yellowish brown fine sandy loam about 8 inches thick. The subsoil is mostly yellowish brown, strong brown, and yellowish red clay loam and clay about 44 inches thick. The substratum is mostly red, strong brown, white, and brownish yellow sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small, scattered areas of well drained Appling, Cecil, and Faceville soils and moderately well drained Savannah soils. Also included are soils that have a gravelly fine sandy loam surface layer and severely eroded soils that have a yellowish brown sandy clay loam and clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as cropland. In some areas it is used as woodland, and in a few areas it is used for urban development.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil.

The clayey subsoil limits the use of this soil as sites for buildings and also limits excavation. Low strength limits the use of this soil for roads. The moderate permeability of the subsoil limits the use of this soil for septic tank absorption fields.

The capability subclass is IIe.

37C—Spotsylvania fine sandy loam, 7 to 15 percent slopes. This is a deep, sloping, well drained soil on narrow, convex ridgetops, points of ridges, and narrow, convex side slopes. The areas of this soil commonly are long and winding. They range in size from 2 to 10 acres or more.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is light yellowish brown fine sandy loam about 8 inches thick. The subsoil is mostly yellowish brown, strong brown, and yellowish red clay loam and clay about 44 inches thick. The substratum to a depth of 60 inches or more is mostly red, strong brown, white, and brownish yellow sandy clay loam.

Included with this soil in mapping are small, scattered areas of well drained Appling, Cecil, and Faceville soils and moderately well drained Savannah soils. Also included are areas of soils that have a gravelly fine sandy loam surface layer and small areas of severely eroded soils that have a yellowish brown sandy clay loam or clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable and can be easily tilled when it is moist. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland, and in a few areas it is used as pasture.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope limits the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of the soil for roads. Slope and the moderate permeability of the subsoil limit the use of this soil for septic tank absorption fields and recreation areas.

The capability subclass is IIIe.

38B—Suffolk sandy loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on broad convex ridgetops. The areas of this soil commonly are oblong or are irregularly rounded. They range in size from 2 to about 10 acres.

Typically, the surface layer is brown sandy loam about 10 inches thick. The subsoil is strong brown fine sandy loam and sandy clay loam about 33 inches thick. The substratum is pale brown loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained and poorly drained Aquults and moderately well drained Goldsboro soils. Aquults are at the head of small drainageways and along the drainageways. Goldsboro soils are in slight depressions scattered throughout the map unit. Also included are soils that have a gravelly sandy loam, gravelly loamy sand, or loamy sand surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The surface layer and subsoil commonly are strongly acid or very strongly acid except in areas that have been limed.

In some areas this soil is used as cropland. In some areas it is used as woodland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain the organic matter content, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and upland oaks grow well on this soil.

Because of the permeability of the substratum, the use of this soil for septic tank absorption fields and sanitary landfills can cause the contamination of ground water and of nearby streams. A suitable base material is necessary to provide strength and stability to the soil if it is used for roads.

The capability subclass is IIe.

39B—Tatum loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on narrow to moderately wide convex ridgetops. The areas of this soil commonly are irregularly rounded or oblong. They range in size from 2 to about 40 acres or more.

Typically, the surface layer is very dark grayish brown about 2 inches thick. The subsurface layer is brown loam about 6 inches thick. The subsoil is mostly red clay and clay loam about 28 inches thick. The substratum, to a depth of 60 inches or more, is strongly weathered rock that crushes to loam and silt loam.

Included with this soil in mapping are small areas of moderately well drained Abell soils and well drained Brockroad and Catharpin soils. Abell soils are around the head of small drainageways. Areas of Brockroad and Catharpin soils are scattered throughout the map unit. Also included are areas of soils that have a gravelly loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil.

The moderate shrink-swell potential limits the use of this soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of the soil for roads. The moderate permeability of the subsoil limits the use of this soil for septic tank absorption fields. The permeability of the substratum, however, commonly is not a limiting factor for septic tank absorption fields (fig. 4). In some places the depth to hard bedrock limits the deep installation of absorption fields.

The capability subclass is IIe.

39C2—Tatum loam, 7 to 15 percent slopes, eroded. This is a deep, sloping, well drained soil on convex ridgetops, points of ridges, and convex side slopes. The areas of this soil commonly are long and winding. They range in size from 2 to about 30 acres or more.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil is mostly red clay, silty clay, and clay loam about 28 inches thick. The substratum, to a depth of 60 inches or more, is mostly strongly weathered rock that crushes to loam and silt loam.

Included with this soil in mapping are small areas of moderately well drained Abell soils, well drained Brockroad and Catharpin soils, and poorly drained Toddstav soils. Abell soils are around the head of and along drainageways and on toe slopes. Brockroad and Catharpin soils are mainly on ridgetops and points of ridges. Toddstav soils are along drainageways. Also included are soils that have a gravelly loam surface layer and severely eroded soils that have a yellowish red clay loam or silty clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

In most areas this soil is used as woodland. In some areas it is used as cropland.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the

Figure 4.—An area of Tatum loam, 2 to 7 percent slopes. Septic tank absorption systems have to be installed in the substratum because of the moderate permeability of the subsoil.

pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high, especially for loblolly pine, yellow-poplar, and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope and the moderate shrink-swell potential limit the use of the soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. Slope and the moderate permeability of the subsoil limit the use of the soil for septic tank absorption fields and recreation areas. Permeability of the substratum commonly is not a limiting factor for

septic tank absorption fields. In some places the depth to hard bedrock limits the deep installation of absorption fields.

The capability subclass is IIIe.

39D2—Tatum loam, 15 to 25 percent slopes, eroded. This is a deep, moderately steep, well drained soil on side slopes. The areas of this soil are elongated or are long and winding. They range in size from 2 to 10 acres or more.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil is mostly red clay and clay loam about 28 inches thick. The substratum, to a depth of 60 inches or more, is mostly strongly weathered rock that crushes to loam and silt loam.

Included with this soil in mapping are small areas of moderately well drained Abell soils, well drained LaRoque soils, and poorly drained Toddstav soils. Abell and Toddstav soils are along drainageways. Areas of LaRoque soils are scattered throughout the map unit. Also included are gullied soils, soils that have a gravelly surface layer, and soils that have a yellowish red clay loam or silty clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is rapid. Erosion is a very severe hazard. The surface layer is friable. It can be easily tilled when it is moist but breaks into clods if tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches or more. The organic matter content and natural fertility are low. The soil is very strongly acid or strongly acid throughout except in areas that have been limed.

This soil is poorly suited to cultivated crops, and it is moderately well suited to pasture and hay. The soil is droughty during the growing season because of the rapid surface runoff, and plant response to lime and fertilizer is limited because of this lack of moisture. Maintaining a mixture of grasses and legumes, proper stocking, and rotation and deferred grazing help increase the carrying capacity of the pasture and control erosion. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil. Logging roads and skid trails should be laid out on the contour to reduce runoff and help control erosion. Because the surface layer is soft and slippery when it is wet and because of the moderately steep slopes, the operation of heavy equipment is hazardous.

The slopes limit the use of this soil as sites for buildings, septic tank absorption fields, and sanitary landfills and for most recreation uses.

The capability subclass is IVe.

40—Tetotum Variant loam. This is a deep, nearly level, moderately well drained soil on broad terraces. The areas of this soil are long and narrow or irregularly rounded and are slightly concave to slightly convex. They range in size from 2 to about 20 acres.

Typically, the surface layer is dark brown loam about 2 inches thick. The subsurface layer is light yellowish brown loam about 6 inches thick. The upper part of the subsoil, to a depth of 42 inches, is mostly yellowish brown clay loam and is mottled below a depth of 26 inches. The lower part of the subsoil, to a depth of 53 inches, is gray sandy loam that is mottled. The substratum, to a depth of 80 inches or more, is mostly gray sandy loam and loam and has mottles that are in shades of brown.

Included with this soil in mapping are small areas of poorly drained and somewhat poorly drained Aquults and well drained Wickham soils. Aquults are at the head of and along drainageways. Wickham soils are in slightly higher areas scattered throughout the map unit. Also included are soils that have a gravelly loam surface layer, narrow strips of Tetotum Variant soils on steeper slopes, and soils that have a compact layer in the subsoil. The included soils make up about 15 to 25 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is very strongly acid throughout except in areas that have been limed. It is occasionally flooded for very brief periods during spring and early in summer. A seasonal high water table is at a depth of 1 1/2 to 2 1/2 feet during winter and early in spring.

In most areas this soil is used as cropland. In some areas it is used as woodland, and in a few areas it is in pasture.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. The soil is wet and cold early in spring, and wetness often delays tillage. Crops are often damaged by very brief flooding during the spring and early in summer. Drainage and flood control help alleviate wetness in spring and reduce crop damage. Minimum tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Alfalfa is often short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications

of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and damages stands of grasses and legumes.

The potential productivity of this soil for trees is high, especially for loblolly pine, yellow-poplar, and upland oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. The use of heavy equipment is limited during wet periods.

The seasonal high water table and the hazard of flooding limit the use of this soil as sites for buildings, sanitary landfills, and septic tank absorption fields. A suitable base material is necessary to provide strength and stability to the soil if it is used for roads.

The capability subclass is IIw.

41—Toccoa loamy sand. This is a deep, nearly level, well drained soil on flood plains along streams and large drainageways. The areas of this soil are low and commonly are long and narrow. They range in size from 2 to about 10 acres or more. The slopes range from 0 to 2 percent.

Typically, the surface layer is brown loamy sand about 9 inches thick. The substratum to a depth of 60 inches or more is brown and strong brown loamy sand, sandy loam, and loam.

Included with this soil in mapping are small areas of moderately well drained Abell soils, somewhat poorly drained or poorly drained Aquults, poorly drained Fluvaquents, and well drained Wickham soils. Abell and Wickham soils are in slightly higher areas, mainly close to the higher terraces or uplands. Areas of Aquults and Fluvaquents are scattered throughout the map unit. Also included are small areas of soils that have a gravelly loamy sand surface layer. The included soils make up about 15 percent of the map unit.

Permeability is moderately rapid, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The surface layer is friable and can be easily tilled. The substratum has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are medium. The soil is slightly acid to strongly acid throughout except in areas that have been limed. It is frequently flooded for brief periods during winter and spring. It has a seasonal water table at a depth of 2 1/2 to 5 feet during winter and spring.

In some areas this soil is used as woodland. In some areas it is used as cropland, and in a few areas it is in pasture.

If the soil is protected from flooding, it is well suited to cultivated crops. Crops respond well to lime and fertilizer. If the soil is not protected from flooding, crops will be damaged by brief flooding during spring, on an average of once a year. Minimum tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, reduce crusting, and increase water infiltration.

This soil, if it is protected from flooding, is well suited to hay and pasture. Alfalfa is short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, flood control, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and damages stands of grasses and legumes.

The potential productivity of this soil for trees is very high, especially for loblolly pine and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft, thus the use of heavy equipment is limited.

The hazard of flooding restricts the use of this soil as sites for buildings, sanitary landfills, and septic tank absorption fields. Flooding limits excavation, and it limits the use of the soil as recreation areas.

The capability subclass is IIw.

42B—Toddstav silt loam, 0 to 4 percent slopes. This is a deep, nearly level, poorly drained soil along drainageways, in upland depressions, and on toe slopes. The areas of this soil are irregularly oval or long and narrow. They range in size from 2 to more than 30 acres.

Typically, the surface layer is very dark grayish brown silt loam about 3 inches thick. The subsurface layer is gray silt loam about 4 inches thick. The subsoil, which extends to a depth of 65 inches, is mostly gray silt loam, loam, and silty clay loam and is mottled with brighter colors. The substratum, to a depth of 70 inches or more, is gray loam.

Included with this soil in mapping are small areas of well drained LaRoque soils, moderately well drained Margo soils, and well drained Nason and Tatum soils. These soils are in slightly higher areas scattered throughout the map unit. Also included are soils that have a gravelly silt loam surface layer, soils that have a brittle compact layer in the subsoil, and soils that have up to 10 inches of overwash on the surface. The included soils make up about 15 percent of the map unit.

Permeability is slow or moderately slow, and the available water capacity is moderate. Surface runoff is slow to medium. Erosion is a slight hazard. The surface layer is friable and can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is extremely acid to strongly acid throughout except in areas that have been limed. It is frequently flooded for brief periods during winter and spring and after heavy rains. In some areas the soil is ponded and has a seasonal high water table that is between the surface and a depth of 1 foot during winter and spring.

Figure 5.—Fescue and ladino clover pasture on poorly drained Toddstav silt loam, 0 to 4 percent slopes.

If the soil is drained, it is moderately well suited to cultivated crops. The soil is wet and cold in spring, and wetness delays tillage. If the soil is not drained, cultivated crops cannot be grown in most years.

This soil is moderately well suited to hay and pasture (fig. 5). Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, drainage, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and damages stands of grasses and legumes.

The potential productivity of this soil for trees is moderately high, especially for loblolly pine and willow oak. Seeds and seedlings survive and grow well if competing vegetation is controlled. The use of heavy equipment is limited during wet periods.

The seasonal high water table restricts the use of this soil for sanitary landfills. The slow or moderately slow permeability of the subsoil and the seasonal high water table limit the use of this soil for septic tank absorption fields. A suitable base material is necessary to provide strength to the soil if it is used for roads.

The capability subclass is Vw.

43B—Turbeville loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on convex ridgetops. The areas of this soil commonly are irregularly rounded or are elongated. They range in size from 2 to about 20 acres.

Typically, the surface layer is brown loam about 12 inches thick. The subsoil is mostly red loam, clay loam, and clay, to a depth of 60 inches or more.

Included with this soil in mapping are small, scattered areas of well drained Appling, Cecil, Masada, Nason, and Tatum soils. Also included are soils that have a gravelly loam surface layer and severely eroded soils that have a reddish brown clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and

can be easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

In many areas this soil is used as cropland. In some areas it is used as woodland, and in a few areas it is used for urban development.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and yellow-poplar grow well on this soil.

The moderate shrink-swell potential limits the use of this soil as sites for buildings, and the clayey subsoil limits excavation. Low strength limits the use of this soil for roads. The moderate permeability of the subsoil limits the use of this soil for septic tank absorption fields.

The capability subclass is IIe.

43C2—Turbeville loam, 7 to 15 percent slopes, eroded. This is a deep, sloping, well drained soil on convex side slopes. The areas of this soil commonly are long and irregular. They range in size from 2 to about 15 acres or more.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil is mostly red loam, clay loam, and clay, to a depth of 60 inches or more.

Included with this soil in mapping are small, scattered areas of well drained Appling, Cecil, Masada, Nason, and Tatum soils. Also included are soils that have a gravelly loam surface layer and severely eroded soils that have a reddish brown clay loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. Erosion is a severe hazard. The surface layer is friable. It can be easily tilled but breaks into clods if tilled when it is too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soil is strongly acid or very strongly acid throughout except in areas that have been limed.

In many areas this soil is used as cropland. In some areas it is used as woodland, and in a few areas it is used for urban development.

This soil is moderately well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential productivity of this soil for trees is moderately high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and yellow-poplar grow well on this soil.

Slope and the moderate shrink-swell potential limit the use of this soil as sites for buildings. The clayey subsoil and slope limit excavation. Low strength limits the use of this soil for roads. Slope and the moderate permeability of the subsoil limit the use of this soil for septic tank absorption fields.

The capability subclass is IIIe.

44—Udorthents, gravelly. This map unit consists of areas where sand and gravel have been mined and nearby areas where the soils have been disturbed by the mining operations. The soils formed in fluviomarine sediment. Some are on stream terraces where there are large deposits of sand and gravel. Some areas have been abandoned, and some are still being mined. A few areas have been smoothed and covered with stockpiled soil material. These areas commonly are irregularly rectangular or are oval shaped. The slopes range from 2 to about 25 percent, but there are nearly vertical walls in some places. The mapped areas range from 3 to about 200 acres in size.

The soil material commonly ranges from sandy loam to sand and gravel. There are varying amounts of cobblestones and boulders. The soil in graded areas ranges from loamy sand to sandy clay loam.

Permeability ranges from rapid to slow. The available water capacity is low. Surface runoff is rapid to slow, and erosion is a slight to severe hazard. The organic matter content and natural fertility are low. The soils are medium acid or very strongly acid throughout. In some areas there is standing water in winter and spring or throughout the year.

Thin brush, grass, and annual weeds are common in these areas. Some of the smoothed areas are used as cropland.

The use and management of Udorthents should be based on an onsite investigation.

A capability class was not assigned.

45B—Udorthents-Udifluvents complex, gently sloping. The soils making up this complex are deep, gently sloping, and well drained to somewhat poorly drained. They are along drainageways and small streams. The areas of these soils are so intermingled that it was not practical to map the soils separately. The mapped areas are long and winding and range from 2 to about 50 acres or more in size. The slopes commonly range from 2 to 7 percent. The complex consists of about 50 percent Udorthents, 35 percent Udifluvents, and 15 percent other soils.

Typically, Udorthents have a gray or brown sandy loam or loamy sand surface layer about 10 to 16 inches thick. The substratum, to a depth of 60 inches or more, is mostly yellowish brown or brownish yellow loamy sand or sandy loam. In some places there are gray mottles below a depth of about 16 inches.

Typically, Udifluvents have a grayish brown, brown, or pale brown loamy sand or sandy loam surface layer about 8 to 16 inches thick. The substratum, to a depth of 60 inches or more, commonly is yellowish brown or brownish yellow and ranges from sand and loamy sand to loam and clay loam. There are gray mottles below a depth of about 20 inches in some places.

The other soils included in this complex are the somewhat poorly drained or poorly drained Aquults and moderately well drained Goldsboro soils. Areas of these soils are scattered throughout the map unit. Also included are very poorly drained soils, ponded soils, small areas of standing water, and soils that have a clayey subsoil.

Permeability of the soils making up this complex is rapid to moderate, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The surface layer is friable and can be easily tilled. The substratum has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The soils are strongly acid or very strongly acid throughout. In many areas the soils dry slowly in spring and after heavy rains. They are commonly flooded for brief periods during winter and spring and after heavy rains. A seasonal high water table is at a depth of 1 1/2 to 4 feet during winter and spring.

If the soils are drained and are protected from flooding, they are moderately well suited to crops. The soils are wet and cold in spring, and wetness often delays tillage. If the soils are not protected from flooding, crops commonly will be damaged by flooding. Minimum tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain tilth and the organic matter content, reduce crusting, and increase water infiltration.

These soils are moderately well suited to hay and pasture. Alfalfa is short-lived because of seasonal wetness. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, flood control, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing or grazing when the soil is wet compacts the surface layer and damages stands of grasses and legumes.

In most areas these soils are used as woodland. The potential productivity of these soils for trees is high, especially for loblolly pine, sycamore, yellow-poplar, and sweetgum. Seeds and seedlings survive and grow well if competing vegetation is controlled. The use of heavy equipment is limited during wet periods.

The seasonal high water table and the hazard of flooding limit the use of these soils as sites for buildings, sanitary landfills, and septic tank absorption fields. The water table and flooding limit excavation; they also limit the use of these soils as recreation areas.

The capability subclass is IVw.

46—Urban Land-Udults complex, smoothed. This complex is made up of areas covered by asphalt, concrete, buildings, or other impervious surfaces and soils that have been disturbed by cutting and filling or shaping during construction. The mapped areas of this complex are irregularly rectangular and range from about 2 to more than 20 acres in size. The slopes mostly range from 0 to 15 percent, although they range to 60 percent in small areas. The complex consists of about 55 percent Urban Land and 45 percent Udults.

A large granite quarry by the Rappahannock River, next to Interstate 95, is included. Also included are small dumps made up of soil material that was surplus or unsuited to construction needs.

The largest area of this complex is the right-of-way for Interstate 95, its exchanges, and the areas along the right-of-way that were involved in its construction. Other areas of this complex are in and around shopping centers, school complexes, business centers, and housing developments. The use and management of the areas making up this complex should be determined by onsite investigation.

A capability subclass was not assigned.

47E—Watt channery silt loam, 15 to 35 percent slopes. This is a moderately deep, moderately steep and steep, somewhat excessively drained soil on side slopes. The areas of this soil commonly are long and narrow. They range from 2 to about 10 acres in size.

Typically, the surface layer is very dark gray channery silt loam about 1 inch thick. The subsurface layer is dark gray channery silt loam about 6 inches thick. The subsoil is very dark gray channery silt loam about 9 inches thick. The substratum, which extends to a depth of about 32 inches, is very dark gray channery silt loam. Bedrock is at a depth of about 32 inches.

Included with this soil in mapping are small, scattered areas of well drained Brockroad, Catharpin, LaRoque, Nason, and Tatum soils. The included soils make up about 20 percent of the map unit.

Permeability is moderately rapid, and the available water capacity is low. Surface runoff is rapid. Erosion is a very severe hazard. The subsoil has a low shrink-swell potential. The root zone extends to bedrock. The organic matter content and natural fertility are low. The soil is extremely acid or very strongly acid throughout. Depth to bedrock ranges from 20 to 40 inches.

This soil is not suited to cultivated crops and is poorly suited to pasture. It is droughty during the growing season. Maintaining a mixture of grasses and legumes, proper stocking, and rotation and deferred grazing help increase the carrying capacity of the pasture and control erosion. Overgrazing compacts the surface layer and increases runoff and erosion.

In most areas this soil is used as woodland. The potential productivity of this soil for trees is moderate. The growth of loblolly pine and upland oaks is fair on this soil. Seeds and seedlings are affected by drought during the growing season. Logging roads and skid trails should be laid out on the contour to reduce concentrated runoff and help control erosion. Slope limits the safe operation of equipment. The limited depth to bedrock makes windthrow a hazard in many places.

Slope and the depth to bedrock limit the use of this soil as sites for buildings, septic tank absorption fields, and sanitary landfills. Slope limits its use as recreation areas.

The capability subclass is VIIe.

48A—Wickham loam, 0 to 2 percent slopes. This is a deep, nearly level, well drained soil on moderately broad to broad terraces along large streams. The areas of this soil commonly are elongated or irregularly rectangular. They range in size from 2 to about 30 acres or more.

Typically, the surface layer is brown loam about 10 inches thick. The subsoil is mostly strong brown and yellowish red loam about 36 inches thick. The substratum is strong brown gravelly sand or loam.

Included with this soil in mapping are small areas of moderately well drained Altavista soils and somewhat poorly drained or poorly drained Aquults. Altavista soils are in slight depressions, and Aquults are at the head of and along small drainageways. Also included are soils that have a gravelly loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is slow. Erosion is a slight hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The surface layer and subsoil are medium acid or strongly acid except in areas that have been limed.

In most areas this soil is used as cropland. In some areas it is used as woodland, and in a few areas it is used for urban development.

This soil is well suited to cultivated crops (fig. 6). Crops respond well to lime and fertilizer. Minimum tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain the organic matter content, reduce crusting, and increase water infiltration.

This soil is very well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer.

The potential productivity of this soil for trees is high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil.

Because of the permeability of the substratum, septic tank absorption fields on this soil can contaminate ground water and nearby streams. A suitable base material is necessary to provide strength and stability to the soil if it is used for roads.

The capability class is I.

48B—Wickham loam, 2 to 7 percent slopes. This is a deep, gently sloping, well drained soil on moderately broad to broad terraces along large streams. The areas of this soil commonly are elongated or irregularly rectangular. They range in size from 2 to about 50 acres of more.

Typically, the surface layer is brown loam about 10 inches thick. The subsoil is mostly strong brown and yellowish red loam about 36 inches thick. The substratum is strong brown gravelly loam.

Included with this soil in mapping are small areas of moderately well drained Altavista soils and somewhat poorly drained or poorly drained Aquults. Altavista soils are in slight depressions. Aquults are at the head of drainageways and along small drainageways. Also included are soils that have a gravelly loam surface layer. The included soils make up about 20 percent of the map unit.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is medium. Erosion is a moderate hazard. The surface layer is friable and can be easily tilled within a wide range of moisture content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The organic matter content and natural fertility are low. The surface layer and subsoil are medium acid or strongly acid except in areas that have been limed.

In most areas this soil is used as cropland. In some areas it is used as woodland, and in a few areas it is used for urban development.

Figure 6.—Soybeans grow well on well drained Wickham loam, 0 to 2 percent slopes.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, contour tillage, cover crops, grasses and legumes in the cropping system, and crop residue returned to the soil help maintain the organic matter content, reduce crusting, and increase water infiltration.

This soil is well suited to hay and pasture. Maintaining a mixture of grasses and legumes, proper stocking, rotation and deferred grazing, and applications of lime and fertilizer help increase the carrying capacity of the pasture. Overgrazing compacts the surface layer.

The potential productivity of this soil for trees is high. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, yellow-poplar, and upland oaks grow well on this soil.

Because of the permeability of the substratum, septic tank absorption fields on this soil can contaminate ground water and nearby streams. A suitable base material is necessary to provide strength and stability to the soil if it is used for roads.

The capability subclass is IIe.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing food or fiber or are available for these uses. Urban or built-up land and water areas cannot be considered prime farmland.

Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 6 percent. More information on the criteria for prime farmland soils can be obtained at the local office of the Soil Conservation Service.

About 70,000 acres in Spotsylvania County, or nearly 26 percent of the county, is prime farmland. Areas of prime farmland are scattered throughout the county, but most are in the central part. The largest areas are in map units 3, 4, and 5 on the general soil map. Approximately 15,000 acres of prime farmland is used for crops in Spotsylvania County.

A recent trend in land use has been the conversion of some prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are wet, more erodible, droughty, or difficult to cultivate and less productive than prime farmland.

The following map units, or soils, make up prime farmland in Spotsylvania County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

1B Abell sandy loam, 2 to 7 percent slopes
2B Altavista sandy loam, 0 to 4 percent slopes
3B Appling sandy loam, 2 to 7 percent slopes
8B Bama sandy loam, 2 to 7 percent slopes
9B Brockroad silt loam, 2 to 7 percent slopes
11B Catharpin silt loam, 2 to 7 percent slopes
12B Cecil loam, 2 to 7 percent slopes
15B2 Cullen loam, 2 to 7 percent slopes, eroded
16 Dogue loam
18B Emporia sandy loam, 2 to 7 percent slopes
19B Faceville loam, 2 to 7 percent slopes
20B Faceville-Marlboro complex, 2 to 7 percent slopes
21B Faceville-Varina complex, 2 to 7 percent slopes
22B Fluvanna fine sandy loam, 2 to 7 percent slopes
24 Goldsboro sandy loam
25B Kempsville gravelly sandy loam, 2 to 7 percent slopes
28B Margo loam, 2 to 7 percent slopes
29B Masada loam, 2 to 7 percent slopes
30B Mattaponi sandy loam, 2 to 7 percent slopes
37B Spotsylvania fine sandy loam, 2 to 7 percent slopes
38B Suffolk sandy loam, 2 to 7 percent slopes
40 Tetotum Variant loam
43B Turbeville loam, 2 to 7 percent slopes
48A Wickham loam, 0 to 2 percent slopes
48B Wickham loam, 2 to 7 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

L. Willis Miller, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

According to the Virginia Land Use Inventory, more than 33,000 acres in Spotsylvania County was used as cropland and pasture in 1979. Of this, about 10,500 acres was used for row crops, such as corn and soybeans; 6,200 acres was used for close-grown crops, such as wheat, rye, oats, and barley; 2,300 acres was used for hay; and 14,000 acres was used for pasture. An additional 200,000 acres was used as woodland. About 55,000 acres that is used for pasture or woodland has good potential for use as cropland.

In Spotsylvania County, the acreage of cropland has been gradually decreasing, and the acreage in pasture has been increasing as more beef cattle are raised. A small acreage that had been used as cropland and pasture is now used for urban development.

Soil erosion is the major hazard on cropland in Spotsylvania County. Most soils have slopes of more than 2 percent and are susceptible to erosion.

Loss of the surface layer through erosion reduces the productivity, fertility, and water holding capacity of the soil. Erosion is especially damaging to soils that have a clayey subsoil, such as Appling, Cecil, Iredell, and Orange soils, to soils that have bedrock near the surface, and to soils that tend to be droughty, such as LaRoque and Pacolet soils.

Soil erosion also causes sedimentation of streams. Erosion control minimizes pollution of streams and improves the quality of water for municipal use, for recreation use, and for fish and wildlife.

Tilling to prepare a good seedbed is difficult on severely eroded soils because of the increased clay content of the surface layer and the decreased organic matter content. Establishing a good stand of any crop is difficult in eroded areas because of the reduced available moisture in the soil and the poor soil-seed contact in the seedbed. Severe erosion is common in areas of Cecil, Cullen, Nason, Pacolet, and Tatum soils. Severe erosion generally is less common in areas of Appling and Savannah soils.

Erosion control practices that include protective plant cover help reduce runoff and increase water infiltration. A cropping system, for example, that keeps a plant cover on the soil year-round can keep soil loss to an amount that will not reduce the productivity of the soil. Legume and grass forage crops in the cropping system not only reduce erosion but also provide nitrogen for the following crop and improve soil tilth.

Contour stripcropping and grassed waterways are erosion control practices commonly used in the county. They are best suited to soils that have smooth, uniform slopes. Terraces and diversions help control runoff and erosion by reducing the length of the slope. They are best suited to deep, well drained soils that have long, smooth slopes, such as Appling and some Cecil soils. Contour tillage and terracing are not practical in most areas of Nason, Pacolet, Poindexter, or Tatum soils. On these soils, substantial plant cover is needed to control erosion.

Minimum tillage, crop residue on the surface, and winter cover crops help increase the permeability of the soil and reduce runoff and erosion. These practices are suited to most soils in the county and are especially important on the more eroded soils.

Soil fertility in most soils is low. Most soils are very strongly acid or strongly acid, unless they have been limed. The Iredell, Orange, and Poindexter soils on uplands and the Toccoa soils on flood plains commonly are not so acid, and their natural fertility is moderate. A suitable pH level makes soil nutrients and moisture more available to crops. On most soils, crops respond well to lime and fertilizer if the application is made according to soil tests.

Soil tilth is an important factor influencing seed germination and the permeability of the soil. Soils that have good tilth are granular and porous. Soils that have poor tilth are often cloddy, have poor soil-seed contact, and are less productive.

Most soils that are used for crops have a sandy loam, fine sandy loam, loam, or silt loam surface layer. The organic matter content of these soils is low. Generally, the structure of the surface layer is weak, and rain causes the surface to crust. This crust is hard when it is dry, and it reduces water infiltration and increases runoff. Regular additions of crop residue and other organic material to the surface help improve the soil structure and reduce crust formation.

Tilth is particularly important on soils that have a high clay content in the plow layer, such as Iredell and Orange soils and severely eroded soils. These soils commonly stay wet until about midspring. If the soil is plowed when it is wet, it tends to be cloddy when it dries, and a good seedbed is difficult to prepare.

Drainage is a major management concern on a small acreage that is used for crops and pasture. Some soils are so wet that crop production generally is not practical unless the soils are drained. These soils include the somewhat poorly drained Cartecay and Colfax soils, the moderately well drained to somewhat poorly drained Iredell and Orange soils, and the poorly drained Partlow and Toddstav soils.

Drainage systems should be designed to suit the soil. In some places a combination of surface and subsurface drainage is most suitable. Drains should be more closely spaced in the soils that have slow permeability than they are in the more permeable soils. Subsurface drainage is suitable for soils that have moderate permeability, such as Abell and Goldsboro soils. Subsurface drainage is suitable for soils that have a fragipan in areas where the fragipan is deep enough to allow adequate cover. Locating suitable outlets is difficult in many Coastal Plain areas.

Field crops that are suited to the soils and climate in Spotsylvania County include corn, soybeans, and grain sorghum. Small grains such as wheat, oats, barley, and rye are commonly grown.

Pasture plants that are commonly grown are tall fescue, orchardgrass, and clover. Most improved pastures are seeded to a mixture of tall fescue and ladino clover. Cool-season plants are most commonly grazed in the spring and autumn; there is limited grazing during summer. Warm-season plants, such as common bermudagrass, midland bermudagrass, and lespedeza, could be grown to provide summer grazing.

Maintaining a mixture of grasses and legumes is the major pasture management concern, and overgrazing is the major hazard. Proper stocking, rotation and deferred grazing, weed control, restricted grazing during the wet season, and applications of lime and fertilizer are the major pasture management practices. Stockpiling tall fescue for winter feed reduces the need for hay.

The major grasses harvested for hay are Kentucky 31 tall fescue, orchardgrass, and red clover. Alfalfa is suited to many soils in Spotsylvania County if the proper amount of lime and fertilizer is applied. Midland bermudagrass can also be grown and managed for good quality hay.

Specialty crops are grown on a small scale. Vegetables, apples, peaches, strawberries, and nursery plants are produced, mainly for local markets.

Deep, well drained soils similar to the Faceville and Wickham soils in the central part of the county are especially well suited to most of these specialty crops. Most of the well drained soils are suitable for orchards and nursery plants. In low areas, where air drainage is poor and frost is frequent, the soils generally are not used for early vegetables, small fruits, and orchards.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be

higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

Norman O. Wilson, state staff forester, Soil Conservation Service, assisted in preparing this section.

Spotsylvania County is about 70 percent commercial woodland. About 184,000 acres is in trees, mostly second growth hardwoods, loblolly pine, and Virginia pine (fig. 7).

Native trees consist mainly of mixed stands of chestnut oak, white oak, post oak, scarlet oak, black oak, northern red oak, southern red oak, and hickory. Yellow-poplar is native to the moister soils. Shortleaf pine and Virginia pine are scattered throughout the hardwood stands. Mixed stands of green ash, sweetgum,

Figure 7.—Commercial stand of loblolly pine on well drained Brockroad silt loam, 2 to 7 percent slopes.

blackgum, boxelder, and red maple grow on poorly drained soils.

Most of the native woodland was cleared and the soils were cultivated as the land was settled. The soils gradually eroded, their fertility diminished, and cultivation ceased. The present stands of mixed hardwoods, Virginia pine, and loblolly pine are mostly on land that had been cultivated.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol (woodland suitability) for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w*, indicates excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, d, c, and r.

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

The soils of the survey area are rated in table 7 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to

heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are broom sedge, goldenrod, and beggarweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and huckleberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness.

Figure 8.—Fluvaquents provide habitat for many kinds of wetland wildlife, including beaver.

Examples of coniferous plants are pine, spruce, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds (fig. 8).

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas

include bobwhite quail, dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made

for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered

daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plant growth. Material from the surface layer, therefore, should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches

of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or

weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*4*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquents (*Hapl*, meaning minimal horizonation, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, nonacid, mesic Typic Haplaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*3*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*4*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Abell series

The Abell series consists of deep, moderately well drained soils. Abell soils formed in a layer of alluvium from surrounding soils and in the underlying residuum. The soils are along small drainageways, on toe slopes, and in depressions in the Piedmont region. The slopes range from 2 to 7 percent.

Abell soils are commonly near Appling, Cecil, and Partlow soils. They are not so well drained as Appling and Cecil soils and are better drained than Partlow soils.

Typical pedon of Abell sandy loam, 2 to 7 percent slopes, 300 feet west of Route 601, 0.25 mile north of the junction of Routes 601 and 713:

O1—1 inch to 0; partly decomposed leaves and twigs.
A1—0 to 2 inches; dark grayish brown (10YR 4/2) sandy loam; moderate fine granular structure; very friable; many fine roots; very strongly acid; clear smooth boundary.
A2—2 to 12 inches; pale brown (10YR 6/3) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.
B21t—12 to 28 inches; brownish yellow (10YR 6/6) sandy clay loam; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and medium roots; few thin clay films on faces of peds; common fine flakes of mica; strongly acid; clear smooth boundary.
B22t—28 to 47 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium and coarse distinct light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; few thin clay films on faces of peds; common fine flakes of mica; strongly acid; clear smooth boundary.
IIB23t—47 to 62 inches; yellowish brown (10YR 5/6) sandy clay loam; many medium distinct gray (10YR 6/1) mottles; moderate coarse subangular blocky structure; firm, sticky and plastic; few fine roots; few thin clay films on faces of peds; many fine flakes of mica; gravel line of angular quartz pebbles at a depth of about 47 inches; strongly acid; clear smooth boundary.
IIC—62 to 75 inches; strong brown (7.5YR 5/6) and pale brown (10YR 6/3) sandy loam; massive; very friable, slightly sticky and slightly plastic; few vertical clay flows in the upper part; common fine flakes of mica; strongly acid.

The solum is 36 to more than 60 inches thick. Depth to the residuum is about 24 to 48 inches. Depth to bedrock is more than 5 feet. Reaction of the solum is strongly acid or very strongly acid unless lime has been added. Angular quartz pebbles, 1/4 inch to 2 inches in diameter, make up 0 to 15 percent of the solum. Gravel lines are common between the alluvium and the residuum.

The A horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 2 through 4. It is sandy loam, fine sandy loam, or loam.

The B horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 4 through 8. Mottles that have chroma of 2 or less are in the lower part. The B horizon is loam, sandy loam, sandy clay loam, or clay loam.

The C horizon is multicolored in shades of brown, yellow, or gray. It is strongly weathered granite, gneiss, or schist that crushes easily to sandy loam or loam.

Altavista series

The Altavista series consists of deep, moderately well drained soils that formed in fluvial and marine sediment. Altavista soils are on terraces along the larger streams in the Piedmont region and on the Coastal Plain. The slopes range from 0 to 4 percent.

Altavista soils are commonly near the Wickham soils and the soils mapped as Aquults. They are not so well drained as Wickham soils and are better drained than Aquults.

Typical pedon of Altavista sandy loam, 0 to 4 percent slopes, about 250 feet east of the Ni River, about 0.75 mile southwest of the south end of Route 625:

A1—0 to 1 inch; dark grayish brown (10YR 4/2) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; 3 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; abrupt smooth boundary.
A2—1 inch to 11 inches; brown (10YR 5/3) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; 3 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.
B1t—11 to 17 inches; yellowish brown (10YR 5/4) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few thin clay films on faces of peds; 3 percent rounded quartz pebbles 1/4 to 1 inch in diameter; few fine flakes of mica; very strongly acid; clear smooth boundary.
B21t—17 to 26 inches; yellowish brown (10YR 5/8) sandy clay loam; few fine and medium faint pale brown (10YR 6/3) mottles; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few thin clay films on faces of peds; 5 percent rounded quartz pebbles 1/4 to 1 inch in diameter; common fine flakes of mica; very strongly acid; clear smooth boundary.
B22t—26 to 41 inches; brownish yellow (10YR 6/8) sandy clay loam; common, medium and fine distinct light brownish gray (2.5YR 6/2) and gray (N 5/) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few thin clay films on faces of peds; 5 percent rounded quartz pebbles 1/4 to 1 inch in diameter; common fine flakes of mica; strongly acid; clear smooth boundary.
B3t—41 to 52 inches; brownish yellow (10YR 6/8) sandy loam; many fine and coarse distinct light brownish gray (2.5Y 6/2) and gray (N 5/) mottles; weak fine

subangular blocky structure; friable, slightly sticky and slightly plastic; few thin clay films on faces of peds; 5 percent rounded quartz gravel 1/4 to 1 inch in diameter; common fine flakes of mica; strongly acid; clear smooth boundary.

C1—52 to 64 inches; brownish yellow (10YR 6/8) gravelly loamy sand; many medium and coarse distinct gray (N 5/) mottles; single grained; loose; 16 percent rounded quartz gravel 1/4 to 1 inch in diameter; many fine flakes of mica; strongly acid; abrupt smooth boundary.

C2—64 to 80 inches; brownish yellow (10YR 6/8) loamy sand; single grained; loose; many fine flakes of mica; strongly acid.

The solum is 30 to 60 inches thick. Depth to bedrock is more than 5 feet. Reaction ranges from medium acid to very strongly acid unless lime has been added. Rounded quartz pebbles, up to 2 inches in diameter, make up from 0 to 5 percent of the solum and 0 to 50 percent of the substratum. Flakes of mica are few or common in the B horizon and are few to many in the substratum.

The A horizon has hue of 7.5YR through 2.5Y, value of 4 through 7, and chroma of 1 through 4. It is fine sandy loam, sandy loam, or loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 5 through 7, and chroma of 3 through 8. Mottles that have chroma of 2 or less are in the lower part. The B horizon is sandy clay loam, loam, or clay loam.

The C horizon commonly is stratified. It ranges from gravelly sand to clay.

Appling series

The Appling series consists of deep, well drained soils that formed in material that weathered from granite and granite gneiss. Appling soils are on ridgetops and side slopes of the Piedmont uplands. The slopes range from 2 to 25 percent.

Appling soils are commonly near Cecil, LaRoque, Partlow, Spotsylvania, and Wedowee soils. Appling soils are not so red in the subsoil as Cecil soils. They are deeper to bedrock than LaRoque soils. They are better drained than Partlow soils. Unlike Spotsylvania soils, they do not have a IIB horizon. Appling soils have a thicker solum than Wedowee soils.

Typical pedon of Appling sandy loam, 2 to 7 percent slopes, about 0.5 mile southwest of the south end of Route 625:

Ap1—0 to 2 inches; dark grayish brown (10YR 4/2) sandy loam; moderate fine granular structure; very friable; many fine roots; 2 percent angular quartz pebbles 1/2 inch to 2 inches in diameter; neutral; abrupt smooth boundary.

Ap2—2 to 9 inches; yellowish brown (10YR 5/4) sandy loam; moderate fine granular structure; very friable; many fine roots; 2 percent angular quartz pebbles 1/2 inch to 2 inches in diameter; neutral; abrupt smooth boundary.

B1t—9 to 12 inches; yellowish brown (10YR 5/4) sandy clay loam; moderate very fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few thin clay films on faces of peds; neutral; clear smooth boundary.

B21t—12 to 25 inches; strong brown (7.5YR 5/6) clay; few fine distinct yellowish red (5YR 5/8) and yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm, slightly sticky and plastic; common fine roots; continuous thin clay films on faces of peds; few fine flakes of mica; strongly acid; clear smooth boundary.

B22t—25 to 39 inches; strong brown (7.5YR 5/6) clay; many medium distinct yellowish red (5YR 5/8) and yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm, slightly sticky and plastic; few fine roots; continuous medium clay films on faces of peds; common fine flakes of mica; strongly acid; clear smooth boundary.

B3t—39 to 47 inches; mottled red (2.5YR 5/6), yellowish red (5YR 4/8), and strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; slightly sticky and slightly plastic; common medium clay films on faces of peds; common fine flakes of mica; 5 percent fragments of weathered feldspar; strongly acid; gradual smooth boundary.

C—47 to 80 inches; mottled yellowish red (5YR 5/8), red (2.5YR 4/8), white (10YR 8/1), and brownish yellow (10YR 6/8) sandy loam; massive; very friable; few medium clay flows in the upper 10 inches; common fine flakes of mica; 10 percent fragments of weathered feldspar; strongly acid.

The solum is 40 to 60 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Angular quartz pebbles, 1/2 inch to 2 inches in diameter, make up 0 to 10 percent of the solum. Flakes of mica are few or common in the subsoil and substratum.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 2 through 6. It is fine sandy loam, sandy loam, or coarse sandy loam. The B horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 4 through 8. The B2t horizon is clay or clay loam. The C horizon is sandy loam or sandy clay loam.

Aquults

Aquults in Spotsylvania County consist of deep, poorly drained and somewhat poorly drained soils on stream terraces, in upland depressions, in swales, and on toe slopes. Aquults formed in sandy, loamy, and clayey

alluvium and in sediment of fluviomarine origin. The slopes range from 0 to 3 percent.

Aquults are commonly near Cecil, Faceville, Louisburg, and Tatum soils. Aquults are more poorly drained than these soils and are not used so intensively as the other soils in the county.

Because of the variability of Aquults, a typical pedon is not given. Aquults have a solum that is 30 to more than 60 inches thick. Depth to bedrock is commonly more than 5 feet. Rounded and some angular pebbles, 1/4 inch to 3 inches in diameter, make up 0 to 15 percent of the solum. These soils are strongly acid to extremely acid.

The A horizon is neutral and has value of 3 to 6 or it has hue of 10YR through 5Y, value of 3 to 6, and chroma of 1 to 3. High chroma mottles are common. The A horizon is fine sandy loam, loam, or silt loam. It is 5 to 12 inches thick.

The B horizon is neutral and has value of 4 through 7 or it has hue of 10YR through 2.5Y, value of 4 through 7, chroma of 1 through 3. High chroma mottles are present. The B horizon is sandy loam, loam, clay loam, or clay. It is 20 to more than 60 inches thick.

The substratum has high and low chroma mottles and ranges from loamy sand to clay. In some areas of the Piedmont region, the substratum commonly is weathered bedrock. In some areas, mostly on terraces, the substratum is 10 to 50 percent gravel.

Bama series

The Bama series consists of deep, well drained soils that formed in fluviomarine sediment. Bama soils are on ridgetops and side slopes of Coastal Plain uplands. The slopes range from 2 to 15 percent.

Bama soils are commonly near Emporia, Kempsville, and Savannah soils. Unlike Savannah soils, they do not have a fragipan. They have a thicker solum than Emporia and Kempsville soils.

Typical pedon of Bama sandy loam, 2 to 7 percent slopes, about 1,800 feet south of Route 607, about 0.75 mile east of the intersection of Routes 607 and 633:

O1—1 inch to 0; partly decomposed pine needles and twigs.

Ap—0 to 10 inches; brown (10YR 5/3) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

B1—10 to 14 inches; strong brown (7.5YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many fine and medium roots; 2 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.

B21t—14 to 46 inches; yellowish red (5YR 4/8) sandy clay loam; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few thin clay films on ped faces; 6 percent rounded quartz pebbles 1/4 to 1 inch in diameter; strongly acid; gradual smooth boundary.

B22t—46 to 60 inches; yellowish red (5YR 4/8) sandy clay loam; many medium faint strong brown (7.5YR 5/6) and red (2.5YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few thin clay films on ped faces; 3 percent rounded quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.

B3t—60 to 68 inches; mottled yellowish red (5YR 4/8) and brownish yellow (10YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; 3 percent rounded quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.

C—68 to 86 inches; mottled yellowish brown (10YR 4/6), yellowish red (5YR 4/8), and pinkish gray (5YR 6/2) sandy loam; massive; very friable; 10 percent rounded quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid.

The solum is more than 60 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Rounded quartz pebbles, 1/4 inch to 2 inches in diameter, make up 0 to 10 percent of the solum and 0 to more than 20 percent of the substratum. In some places there are thin lenses of ironstone in the B and C horizons.

The A horizon has hue of 10YR through 5YR, value of 3 through 6, and chroma of 2 through 8. The A horizon is sandy loam, fine sandy loam, or loam. In some places there is a B1 horizon. It has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 through 8. It is fine sandy loam, loam, or sandy clay loam. The B2 and B3 horizons have hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 through 8. The B2 and B3 horizons are sandy clay loam, loam, or clay loam.

The C horizon is Coastal Plain sediment that is highly variable in color and texture.

Brockroad series

The Brockroad series consists of deep, well drained soils. Brockroad soils formed in a mantle of silty and clayey sediment and quartzite pebbles and in the underlying material that weathered from sericite schist. Brockroad soils are on broad ridgetops of the Piedmont uplands. The slopes range from 2 to 7 percent.

Brockroad soils are commonly near Catharpin, LaRoque, Margo, Nason, and Tatum soils. They have a browner subsoil than the Catharpin and Tatum soils, and they have a thicker solum than the LaRoque and Nason soils. Brockroad soils are better drained than Margo soils.

Typical pedon of Brockroad silt loam, 2 to 7 percent slopes, about 15 yards north of Route 621, about 2.5 miles west of the junction of Routes 621 and 613:

O1—2 inches to 0; partly decomposed leaves, pine needles, and twigs.
A1—0 to 1 inch; dark grayish brown (10YR 4/2) silt loam; moderate very fine granular structure; very friable; many fine and medium roots; 2 percent rounded and subrounded reddish quartz pebbles; very strongly acid; abrupt smooth boundary.
A2—1 inch to 9 inches; pale brown (10YR 6/3) silt loam; moderate very fine granular structure; very friable; many fine and medium roots; 2 percent rounded reddish quartz pebbles; very strongly acid; clear smooth boundary.
B1t—9 to 15 inches; light yellowish brown (10YR 6/4) silty clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and medium roots; few thin clay films on faces of peds; 2 percent rounded reddish quartz pebbles; very strongly acid; clear smooth boundary.
B21t—15 to 31 inches; yellowish brown (10YR 5/8) clay; moderate fine and medium subangular blocky structure; firm, sticky and plastic; common fine and medium roots; common medium and thin clay films on faces of peds; 2 percent rounded reddish quartz pebbles; strongly acid; clear smooth boundary.
B22t—31 to 43 inches; yellowish red (5YR 5/6) clay; common medium distinct light yellowish brown (10YR 6/4) mottles; moderate fine and medium subangular blocky structure; firm, plastic and sticky; few fine roots; common medium and thin clay films on faces of peds; 2 percent rounded reddish quartzite pebbles; strongly acid; clear smooth boundary.
IIB23t—43 to 59 inches; yellowish red (5YR 5/6) clay; many medium and coarse distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; common medium clay films on faces of peds; common very fine flakes of mica; strongly acid; gradual smooth boundary.
IIB3t—59 to 75 inches; mottled yellowish red (5YR 5/6) and red (2.5YR 5/6) silty clay loam; common coarse faint red (2.5YR) and reddish yellow (7.5YR 6/6) mottles; weak fine subangular blocky structure; friable, slightly plastic; few thin and medium clay films on faces of peds; many fine flakes of mica; strongly acid; gradual smooth boundary.
IICr—75 to 104 inches; yellowish red (5YR 5/6), red (2.5YR 4/6), strong brown (7.5YR 5/6), and white (10YR 8/2) silt loam; strongly weathered schist; many very fine flakes of mica; strongly acid.

The solum is 45 to more than 80 inches thick. Depth to the IIB horizon ranges from 24 to 50 inches. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added to the soil. Rounded reddish quartzite pebbles, 1/4 inch to 3 inches in diameter, make up 1 to 15 percent of the surface layer and upper part of the subsoil. In some places a thin layer of gravel and cobblestones is at the top of the IIB horizon. The sand fraction is dominantly quartz in the A and B horizons and dominantly mica in the IIB and IIC horizons. The substratum is micaceous.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 through 6. It is silt loam or loam.

The B horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 4 through 8. High chroma mottles are common. The IIB horizon has hue of 2.5YR through 7.5YR, value of 4 or 5, and chroma of 6 through 8. High chroma mottles are common. The B and IIB horizons are clay, silty clay, clay loam, or silty clay loam.

The C horizon is strongly weathered sericite schist. It ranges from clay to silt loam or loam.

Cartecay series

The Cartecay series consists of deep, somewhat poorly drained soils that formed in alluvium. Cartecay soils are on flood plains along streams throughout the county. The slopes range from 0 to 2 percent.

Cartecay soils are commonly near Abell, Toccoa, and Wickham soils, all of which are better drained than Cartecay soils.

Typical pedon of Cartecay sandy loam, about 150 feet south of the Rappahannock River, about 0.5 mile north of Route 618, about 3 miles east of Diswell Chapel:

Ap—0 to 11 inches; dark brown (7.5YR 4/4) sandy loam; moderate fine granular structure; very friable; many fine roots; common fine flakes of mica; strongly acid; clear smooth boundary.
C1—11 to 21 inches; dark yellowish brown (7.5YR 4/4) sandy loam; few medium and fine olive gray (5Y 5/2) and dark gray (5Y 4/1) mottles; massive; friable; many fine roots; few fine brown concretions; common fine flakes of mica; strongly acid; clear smooth boundary.
C2—21 to 28 inches; brown (10YR 4/3) sandy loam; many medium and fine olive gray (5Y 5/2) and dark gray (5Y 4/1) mottles; massive; very friable; common fine roots; few fine brown concretions; common fine flakes of mica; medium acid; clear smooth boundary.
C3—28 to 38 inches; dark grayish brown (10YR 4/2) and very dark gray (10YR 3/1) sandy loam; few fine distinct strong brown (7.5YR 5/6) mottles; massive; friable; few fine roots; few thin sand lenses; few fine brown concretions; common fine flakes of mica; medium acid; clear smooth boundary.
Ab—38 to 52 inches; dark yellowish brown (10YR 3/4), dark gray (10YR 4/1), and light gray (10YR 6/1)

sandy loam; massive; very friable; few fine roots; few fine brown concretions; common fine flakes of mica; medium acid; clear smooth boundary.

C4g—52 to 88 inches; mottled light gray (10YR 6/1) and strong brown (7.5YR 5/6) sandy loam; massive; friable; common fine flakes of mica; common fine black and brown concretions; medium acid.

Depth to bedrock is more than 5 feet. Reaction is strongly acid to slightly acid. Rounded quartz pebbles, 1/4 inch to 3 inches in diameter, make up 0 to 5 percent of the soil material above a depth of 40 inches and 0 to 50 percent below 40 inches. Flakes of mica are few to many throughout.

The A horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 4. It is loam, silt loam, fine sandy loam, sandy loam, or loamy sand. The C horizon has hue of 5YR through 2.5Y, value of 4 through 6, and chroma of 1 through 6. Mottles that have chroma of 2 or less are in the upper 20 inches of the soil. The C horizon is fine sandy loam, sandy loam, loam, sand, loamy sand, or their gravelly analogs.

Catharpin series

The Catharpin series consists of deep, well drained soils. Catharpin soils formed in a mantle of silty and clayey sediment and quartzite pebbles and in the underlying material that weathered from sericite schist. Catharpin soils are on broad ridgetops of the Piedmont uplands. The slopes range from 2 to 7 percent.

Catharpin soils are commonly near Brockroad, Margo, Nason, and Toddstav soils and have a redder subsoil. They are better drained than Margo and Toddstav soils and have a thicker solum than Nason soils.

Typical pedon of Catharpin silt loam, 2 to 7 percent slopes, about 60 feet north of Route 611, about 1 mile west of Parker:

Ap—0 to 9 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; very friable; many fine roots; 3 percent rounded reddish quartzite pebbles 1/4 inch to 2 inches in diameter; medium acid; abrupt smooth boundary.

B1t—9 to 17 inches; yellowish red (5YR 5/6) silty clay loam; weak fine subangular blocky structure; friable, sticky and plastic; common fine roots; few thin clay films; 3 percent rounded reddish quartzite pebbles 1/4 inch to 2 inches in diameter; strongly acid; gradual smooth boundary.

B21t—17 to 26 inches; (2.5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, very sticky and plastic; common fine roots; many medium and thin clay films; 3 percent rounded reddish quartzite pebbles 1/4 inch to 2 inches in diameter; very strongly acid; gradual smooth boundary.

B22t—26 to 37 inches; red (2.5YR 4/8) clay; common fine faint yellowish red (5YR 4/6) mottles; moderate medium and fine subangular blocky structure; firm, very sticky and plastic; few fine roots; many medium clay films; 2 percent rounded reddish quartzite pebbles 1/4 inch to 2 inches in diameter; strongly acid; clear smooth boundary.

IIB23t—37 to 54 inches; red (2.5YR 4/8) clay; moderate fine subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; common medium clay films; 2 percent strongly weathered fragments of schist; common fine flakes of mica; very strongly acid; gradual smooth boundary.

IIB3t—54 to 76 inches; red (2.5YR 4/8) clay; many fine distinct yellowish brown (10YR 5/8) and white (10YR 8/2) mottles; weak fine subangular blocky structure; friable; common medium clay films; 25 percent strongly weathered fragments of schist; many fine flakes of mica; very strongly acid; gradual smooth boundary.

IIC—76 to 99 inches; brown, yellow, red, and white silt loam; massive; friable; strongly weathered micaceous schist; few medium clay flows between rock structure planes; very strongly acid.

The solum is 45 to 90 inches thick. Depth to the IIB horizon ranges from 24 to 50 inches. Depth to bedrock is more than 5 feet. Rounded quartzite pebbles, 1/4 inch to 2 inches in diameter, make up 2 to 15 percent of the solum above the IIB horizon. Strongly weathered fragments of schist and fragments of vein quartz, 1 to 6 inches long, make up 1 to 15 percent of the IIB horizon. In some places a thin layer of gravel and cobblestones is between the B and IIB horizons. Reaction is strongly acid or very strongly acid unless lime has been added to the soil.

The A horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 2 through 4. It is silt loam, silty clay loam, or loam. The B and IIB horizons have hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 through 8. In some places there are high chroma mottles. The B and IIB horizons are clay, silty clay, silty clay loam, or clay loam. In some places there is no B1 horizon. The C horizon is strongly weathered mica schist that crushes easily to silt loam, loam, or sandy loam.

Cecil series

The Cecil series consists of deep, well drained soils that formed in material that weathered from granite, granite gneiss, and schist. Cecil soils are on ridgetops and side slopes of the Piedmont uplands. The slopes range from 2 to 25 percent.

Cecil soils are commonly near Abell, Appling, Pacolet, and Partlow soils. They are better drained than Abell and Partlow soils and have a redder subsoil. Cecil soils have a redder subsoil than Appling soils. They have a thicker solum than Pacolet soils.

Typical pedon of Cecil loam, 2 to 7 percent slopes, about 20 feet north of Route 615 and about 2 miles northeast of Elys Ford Church:

O1—1 inch to 0; partly decomposed leaves, pine needles, and twigs.
A1—0 to 1 inch; dark grayish brown (10YR 4/2) loam; weak fine granular structure; very friable; many fine and medium roots; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.
A2—1 inch to 8 inches; yellowish brown (10YR 5/4) loam; weak fine granular structure; very friable; many fine roots; 3 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.
B1t—8 to 13 inches; yellowish red (5YR 5/8) loam; moderate fine subangular blocky structure; firm, slightly sticky and slightly plastic; many fine and medium roots; few thin clay films on faces of peds; few fine flakes of mica; 1 percent angular quartz pebbles 1/4 inch to 3 inches in diameter; very strongly acid; clear smooth boundary.
B21t—13 to 28 inches; red (2.5YR 5/8) clay; moderate medium and fine subangular blocky structure; firm, sticky and plastic; common fine roots; continuous thin clay films on faces of peds; few fine flakes of mica; 1 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; gradual smooth boundary.
B22t—28 to 40 inches; red (2.5YR 5/8) clay; moderate medium and fine subangular blocky structure; firm, sticky and plastic; few fine roots; continuous medium clay films on faces of peds; few fine flakes of mica; 1 percent angular quartz pebbles 1/2 inch to 2 inches in diameter; few fine weathered feldspar crystals; strongly acid; gradual smooth boundary.
B3t—40 to 46 inches; red (2.5YR 5/8) clay loam; common fine and medium yellowish red (5YR 5/8) and white (5YR 8/1) mottles; weak medium subangular blocky structure; slightly sticky and slightly plastic; few fine roots; few medium and thick clay films on vertical faces of peds; common fine flakes of mica; strongly acid; gradual smooth boundary.
C1—46 to 56 inches; red (2.5YR 5/8), yellowish red (5YR 5/8), yellowish brown (10YR 5/8), and white (5YR 8/1) loam; massive; very friable; many clay flows in vertical seams; common fine flakes of mica; strongly acid; gradual smooth boundary.
C2—56 to 74 inches; red (2.5YR 5/8), yellowish red (5YR 5/8), yellowish brown (10YR 5/8), and white (5YR 8/1) loam; massive; very friable; strongly weathered granite gneiss; few thin clay flows in upper part; common fine flakes of mica; strongly acid.

The solum is 40 to more than 60 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Angular quartz pebbles, 1/4 inch to 3 inches in diameter, make up 0 to about 10 percent of the solum. Flakes of mica are few to common in the B and C horizons.

The A horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 through 6. Typically, it is fine sandy loam, sandy loam, or loam. If eroded, it is sandy clay loam or clay loam.

The B1 horizon has hue of 5YR, value of 4 or 5, and chroma of 4 through 8. It is sandy clay loam, loam, or clay loam. The B2 horizon has hue of 2.5YR and 10YR, value of 4 or 5, and chroma of 6 or 8. It is clay loam or clay.

The C horizon is strongly weathered granite, granite gneiss, or schist that crushes easily to sandy loam, loam, or sandy clay loam.

Colfax series

The Colfax series consists of deep, somewhat poorly drained to moderately well drained soils that formed in material that weathered from granite and granite gneiss. Colfax soils are in saddles, in upland depressions, at the head of drainageways, along small drainageways, and on toe slopes. The slopes range from 2 to 15 percent.

Colfax soils are commonly near Abell, Appling, Cecil, LaRoque, and Spotsylvania soils. Colfax soils are more poorly drained than these soils, and unlike the other soils, Colfax soils have a fragipan (fig. 9).

Typical pedon of Colfax sandy loam, 2 to 7 percent slopes, 4 miles northwest of Spotsylvania at the south end of Route 697:

O1—1 inch to 0; pine needles and twigs.
A1—0 to 1 inch; dark grayish brown (10YR 4/2) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; 1 percent angular quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.
A2—1 inch to 7 inches; pale brown (10YR 6/3) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; 1 percent angular quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.
B1—7 to 10 inches; light yellowish brown (10YR 6/4) sandy clay loam; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and medium roots; 3 percent angular quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.
B21t—10 to 18 inches; brownish yellow (10YR 6/6) sandy clay loam; common fine and medium distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; friable, slightly sticky and slightly

Figure 9.—This gross polygonal structure, viewed from above, is characteristic of the fragipan in the somewhat poorly drained to moderately well drained Colfax sandy loam, 2 to 7 percent slopes.

plastic; common fine roots; few thin clay films on faces of peds; few fine flakes of mica; 7 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

Bx—18 to 25 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; many medium distinct light brownish gray (2.5Y 6/2) and light gray (10YR 6/1) mottles; moderate coarse prismatic structure parting to moderate thick platy; firm, slightly sticky and slightly plastic; brittle and compact in place; common thin clay films on faces of peds; 10 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; few fine roots on structure surfaces; very strongly acid; clear smooth boundary.

B22t—25 to 37 inches; light brownish gray (2.5Y 6/2) clay loam; common medium distinct light gray (10YR 7/1) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common fine roots; many medium clay films on faces of peds; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; gradual smooth boundary.

B3t—37 to 43 inches; yellowish brown (10YR 5/8) sandy clay loam; many medium distinct light brownish gray (2.5Y 6/2) and gray (N 6/) mottles; moderate coarse subangular blocky structure; firm, slightly sticky and slightly plastic; many medium clay films on faces of peds; common fine flakes of mica; 4 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; gradual smooth boundary.

C—43 to 67 inches; light brownish gray (2.5YR 6/2), brownish yellow (10YR 6/6), white (10YR 8/2), and gray (10YR 6/1) sandy loam from strongly weathered granite gneiss; massive; friable; few thin clay flows in seams; common flakes of mica; very strongly acid.

The solum is 40 to 60 inches thick. Depth to the fragipan ranges from 16 to 30 inches. Depth to bedrock is more than 5 feet. Angular quartz pebbles make up 2 to 10 percent of the solum.

The A horizon has hue of 5Y through 10YR, value of 4 through 6, and chroma of 2 through 4. It is sandy loam, loam, or fine sandy loam. The B horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 through 8. It is sandy clay loam, clay loam, or loam. The Bx horizon or fragipan has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 4 or 6. It is sandy loam or sandy clay loam. The C horizon typically is multicolored sandy loam or sandy clay loam.

Cullen series

The Cullen series consists of deep, well drained soils that formed in material that weathered from mixed basic and acidic rocks. Cullen soils are on ridgetops and side slopes of the Piedmont uplands. The slopes range from 2 to 25 percent.

Cullen soils are commonly near Appling, Fluvanna, Louisburg, and Poindexter soils and have a redder subsoil than those soils. Cullen soils have more clay in the subsoil and have a thicker solum than Louisburg and Poindexter soils.

Typical pedon of Cullen loam, 2 to 7 percent slopes, eroded, about 2 miles west of Post Oak on the south side of Route 606:

Ap—0 to 8 inches; reddish brown (5YR 4/4) loam; moderate fine granular structure; friable; many fine roots; 1 percent angular quartz pebbles up to 1/2 inch in diameter; strongly acid; abrupt smooth boundary.

B21t—8 to 30 inches; red (10YR 4/6) clay; moderate fine subangular blocky structure; firm, sticky and slightly plastic; many fine roots; continuous thin clay films on faces of peds; few fine flakes of mica; 1 percent fine angular quartz pebbles up to 1/2 inch in diameter; strongly acid; clear smooth boundary.
B22t—30 to 38 inches; red (10YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; continuous medium dark red (2.5YR 3/6) clay films on faces of peds; few fine flakes of mica; 3 percent yellowish brown fragments of weathered hornblende schist up to 2 inches long; strongly acid; clear smooth boundary.
B3t—38 to 44 inches; red (2.5YR 4/6) clay loam; common medium faint yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common medium clay films on faces of peds; 6 percent fragments of weathered hornblende schist 2 to 4 inches long; strongly acid; gradual smooth boundary.
C—44 to 67 inches; yellowish red (5YR 5/6) and yellowish brown (10YR 6/6) clay loam; massive; friable, sticky and slightly plastic; many medium clay flows in seams; 10 percent fragments of weathered hornblende schist; strongly acid; gradual wavy boundary.
Cr—67 to 75 inches; partly weathered hornblende schist.

The solum is 40 to more than 60 inches thick. Depth to weathered bedrock is 42 to more than 60 inches. Depth to hard rock is more than 5 feet. Reaction is medium acid or strongly acid unless lime has been added to the soil. Angular quartz pebbles, 1/4 inch to 2 inches in diameter, and fragments of weathered hornblende schist, 1 inch to 4 inches long, make up 0 to 10 percent of the solum.

The A horizon has hue of 5YR through 10YR, value of 3 or 4, and chroma of 2 through 4. It is loam, fine sandy loam, or silt loam. In areas where the soil is severely eroded the A horizon is clay loam.

The Bt horizon has hue of 2.5YR or 10R, value of 3 or 4, and chroma of 4 through 8. It is clay, clay loam, or silty clay.

The C horizon is strongly weathered hornblende gneiss that crushes easily to clay loam or loam. It contains 0 to 20 percent fragments of weathered hornblende schist or similar rock. In some places there is no Cr horizon.

Dogue series

The Dogue series consists of deep, moderately well drained soils that formed in alluvium. Dogue soils are on low terraces along the larger streams in the county. The slopes range from 0 to 3 percent.

Dogue soils are commonly near Altavista and Wickham soils and soils mapped as Aquults. They have more clay in the subsoil than Altavista and Wickham soils and are not so well drained as Wickham soils. Dogue soils are better drained than Aquults.

Typical pedon of the Dogue loam, about 200 feet east of Route 638, Lansdown Road, and about 0.5 mile south of the railroad track:

Ap—0 to 10 inches; dark yellowish brown (10YR 4/4) loam; moderate fine granular structure; very friable; many fine roots; few fine flakes of mica; slightly acid; clear smooth boundary.
B1—10 to 13 inches; yellowish brown (10YR 5/6) clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; few fine flakes of mica; few fine dark brown and black concretions; slightly acid; clear smooth boundary.
B21t—13 to 26 inches; yellowish brown (10YR 5/6) clay; moderate fine subangular blocky structure; firm, sticky and plastic; common fine roots; few thin clay films on faces of peds; few fine flakes of mica; common dark brown concretions; medium acid; clear smooth boundary.
B22t—26 to 42 inches; yellowish brown (10YR 5/6) clay; common medium distinct light gray (10YR 7/1) and strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; firm, sticky and plastic; few fine roots; few thin clay films on faces of peds; 2 percent quartz pebbles 1/4 inch to 2 inches in diameter; few fine flakes of mica; strongly acid; clear smooth boundary.
B3—42 to 53 inches; yellowish brown (10YR 5/8) sandy clay loam; many coarse distinct light gray (10YR 7/1) mottles; weak fine and medium subangular blocky structure; friable, sticky and slightly plastic; 2 percent rounded quartz pebbles 1/4 inch to 2 inches in diameter; few fine flakes of mica; very strongly acid; gradual smooth boundary.
C—53 to 65 inches; yellowish brown (10YR 5/8) gravelly sand; many coarse distinct light gray (10YR 7/1) mottles; single grained; loose; 20 percent rounded pebbles of quartz, greenstone, granite gneiss, and schist 1/4 inch to 3 inches in diameter; common fine flakes of mica; very strongly acid.

The solum is 40 to 60 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Rounded pebbles or quartz and other rocks, 1/4 inch to 3 inches in diameter, make up 0 to 10 percent of the solum and 0 to 25 percent of the C horizon. Fine flakes of mica are few to common in the B and C horizons.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. In some places there is an A2 horizon. It has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 4 or 6. The A horizon ranges from loam to silt loam and fine sandy loam.

The B1 horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 4 through 8. It is clay loam or sandy clay loam. The B2t horizon and B3 horizons have hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 4 through 8. The B2t horizon is clay loam or clay. The B3 horizon is clay loam or sandy clay loam.

The C horizon commonly is stratified and ranges from gravelly sand to gravelly sandy clay loam. Pebbles of quartz and other rocks make up to 0 to 25 percent of the horizon.

Dystrochrepts

Dystrochrepts in Spotsylvania County consist of deep, somewhat excessively drained to moderately well drained soils that formed in sandy, loamy, and clayey sediment of fluviomarine origin. These soils are on narrow ridges and side slopes of the Coastal Plain and on some stream terrace breaks in the Piedmont region. The slopes range from 7 to more than 50 percent.

Dystrochrepts commonly are near Kempsville and Savannah soils and Udults. There has been less horizon development in the subsoil of Dystrochrepts than in Kempsville and Savannah soils and Udults.

Because of the variability of Dystrochrepts, a typical pedon is not described. The thickness of the solum ranges from about 10 to 20 inches. Depth to bedrock is more than 5 feet. Rounded pebbles, up to 3 inches in diameter, of quartz or quartzite range from 0 to more than 50 percent throughout. These soils range from extremely acid to strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 3 through 8. It ranges from loamy sand to sandy loam. In some places it is gravelly or very gravelly. The A horizon is 6 to 14 inches thick.

The B horizon has hue of 10YR through 2.5Y, value of 5 through 7, and chroma of 3 through 8. It generally is sandy loam or the gravelly or very gravelly analog. In some places there are thin strata of sand or loamy sand. The B horizon generally is less than 10 inches thick and is weakly expressed. In some places there is no B horizon.

The C horizon has hue of 2.5YR through 2.5Y, value of 4 through 8, and chroma of 1 through 8. It ranges from sandy loam to silt or from sandy loam to clay and their gravelly or very gravelly analogs. In some places there are thin strata of sand or loamy sand.

Emporia series

The Emporia series consists of deep, well drained soils that formed in fluviomarine sediment. Emporia soils are on ridgetops and side slopes of Coastal Plain uplands. The slopes range from 2 to 15 percent.

Emporia soils are commonly near Faceville, Goldsboro, Mattaponi, and Savannah soils. They have less clay than Faceville and Mattaponi soils and are better drained than Goldsboro soils. Unlike Savannah soils, they do not have a fragipan.

Typical pedon of Emporia sandy loam, 2 to 7 percent slopes, 60 feet north of Route 628, about 0.25 mile west of Route 673:

O1—1 inch to 0: partly decomposed leaves, pine needles, and twigs.

A1—0 to 1 inch; dark grayish brown (10YR 4/2) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

A2—1 inch to 9 inches; pale brown (10YR 6/3) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; 1 percent rounded quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

B1t—9 to 15 inches; light yellowish brown (10YR 6/4) sandy clay loam; weak fine subangular blocky structure; friable; common fine and medium roots; few films coating and bridging sand grains; 1 percent rounded quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

B21t—15 to 26 inches; yellowish brown (10YR 5/6) sandy clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; few thin clay films on faces of peds; 1 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.

B22t—26 to 31 inches; strong brown (7.5YR 5/6) sandy clay loam; many fine and medium distinct pale brown (10YR 6/3) and brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; slightly brittle and compact in place; few fine roots; few thin clay films on faces of peds; 1 percent rounded quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.

B23t—31 to 47 inches; strong brown (7.5YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable, sticky and slightly plastic; few fine roots; few thin clay films on faces of peds; 1 percent rounded quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.

B3t—47 to 59 inches; yellowish brown (10YR 5/8) sandy clay loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable, sticky and slightly plastic; 2 percent rounded quartz pebbles 1/2 inch to 2 inches in diameter; strongly acid; clear smooth boundary.

C—59 to 72 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium and coarse distinct light gray (10YR 6/1) and red (2.5YR 5/8) mottles;

massive; friable; very compact and slightly brittle in place; thin lenses and streaks of clay; strongly acid.

The solum is 40 to more than 60 inches thick. Depth to bedrock is more than 5 feet. Rounded quartz pebbles, 1/4 inch to 2 inches in diameter, make up 0 to 15 percent of the solum. Reaction is strongly acid or very strongly acid unless lime has been added. Rounded quartz pebbles, 1/4 inch to 3 inches in diameter, make up 0 to 40 percent of the substratum.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 4. It is sandy loam, loam, or fine sandy loam. The Bt horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. The B22t horizon commonly is brittle in 10 to 50 percent of the horizon. The B horizon is sandy loam, sandy clay loam, or loam. The C horizon is sandy loam to sandy clay or their gravelly analogs.

Faceville series

The Faceville series consists of deep, well drained soils that formed in fluviomarine sediment. Faceville soils are on ridgetops and side slopes of Coastal Plain uplands. The slopes range from 2 to 15 percent.

Faceville soils are commonly near Emporia, Marlboro, Savannah, and Varina soils. Faceville soils have a redder subsoil than Emporia, Marlboro, and Varina soils. Unlike Savannah soils, they do not have a fragipan.

Typical pedon of Faceville loam, 2 to 7 percent slopes, about 60 feet north of Route 606, about 1.25 miles west of Thornburg:

O1—1 inch to 0; partly decomposed oak leaves, pine needles, and twigs.

A1—0 to 2 inches; dark brown (10YR 3/3) loam; moderate fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

A2—2 to 10 inches; brown (10YR 5/3) loam; moderate fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

B1t—10 to 17 inches; strong brown (7.5YR 5/6) loam; weak fine subangular blocky structure; friable, sticky and slightly plastic; many fine and medium roots; few thin clay films in lower part; very strongly acid; clear smooth boundary.

B21t—17 to 34 inches; red (2.5YR 5/8) clay; moderate fine subangular blocky structure; firm, very sticky and plastic; common fine and medium roots; few thin clay films on faces of peds; 2 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; very strongly acid; clear smooth boundary.

B22t—34 to 49 inches; red (2.5YR 4/8) clay; moderate fine and medium subangular blocky structure; firm, very sticky and plastic; few fine roots; few thin and medium clay films on faces of peds; 2 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; strongly acid; gradual smooth boundary.

B23t—49 to 73 inches; red (2.5YR 4/8) clay; common medium and coarse distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm, very sticky and plastic; few fine roots; common thin and medium clay films on faces of peds; 2 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; few fine iron concretions; strongly acid; gradual smooth boundary.

B3t—73 to 87 inches; yellowish red (5YR 4/8) clay; many fine and medium distinct brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; firm, very sticky and plastic; few fine rounded quartz pebbles 1/4 to 1/2 inch in diameter; few fine iron concretions; strongly acid.

The solum is more than 65 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Rounded quartz pebbles, 1/4 to 2 inches in diameter, make up 0 to 10 percent of the solum. In some places plinthite nodules range from 0 to 4 percent below a depth of 50 inches.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3. The A2 horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 or 4. The A horizon is loam, sandy loam, or sandy clay loam.

The B1t horizon has hue of 7.5YR through 2.5YR, value of 4 or 5, and chroma of 6 or 8. It is loam, sandy clay loam, or clay loam. The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 through 8. The B2t horizon is clay, clay loam, or sandy clay.

In some places there is a C horizon. It commonly is Coastal Plain sediment that ranges from clay to sand and can be up to 50 percent rounded quartz pebbles that are up to 3 inches in diameter.

Fluvanna series

The Fluvanna series consists of deep, well drained soils that formed in material that weathered from hornblende gneiss or diorite gneiss. They are on ridgetops and side slopes of Piedmont uplands. The slopes range from 2 to 25 percent.

Fluvanna soils are commonly near Cecil, Cullen, Orange, Poindexter, and Tatum soils. The subsoil of Fluvanna soils is not so red as the subsoil of Cecil, Cullen, and Tatum soils. Fluvanna soils are better drained than Orange soils. They have more clay and a thicker solum than Poindexter soils.

Typical pedon of Fluvanna fine sandy loam, 2 to 7 percent slopes, about 1 mile south of Lewiston, about 75 feet south of Route 601:

O1—1 inch to 0; partly decomposed oak leaves, pine needles, and twigs.

A1—0 to 1 inch; dark brown (10YR 3/3) fine sandy loam; moderate fine granular structure; very friable; many fine roots; very strongly acid; clear smooth boundary.
A2—1 inch to 7 inches; brown (7.5YR 5/4) fine sandy loam; moderate fine granular structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary.
B1t—7 to 10 inches; reddish brown (5YR 5/4) loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and medium roots; few thin clay films on faces of peds; very strongly acid; clear smooth boundary.
B21t—10 to 24 inches; yellowish red (5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky and plastic; common fine and medium roots; many thin clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.
B22t—24 to 41 inches; yellowish red (5YR 4/6) clay; few fine and medium distinct yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm, slightly sticky and plastic; common fine roots; many thin and medium clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.
B3t—41 to 49 inches; yellowish brown (10YR 5/4) clay; many medium faint brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm, slightly sticky and plastic; common thin clay films on faces of peds; few fine roots; few fine flakes of mica; 2 percent fine fragments of weathered gneiss 1 inch to 3 inches long; very strongly acid; gradual smooth boundary.
C—49 to 73 inches; yellowish brown (10YR 5/4) clay loam; common medium strong brown (7.5YR 5/6) mottles; massive; friable; few fine flakes of mica; 8 percent strongly weathered fragments of hornblende gneiss 1 inch to 3 inches long; very strongly acid; gradual irregular boundary.
Cr—73 inches; partly weathered hornblende gneiss or diorite gneiss.

The solum is 30 to 55 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid to very strongly acid unless lime has been added. Weathered fragments of hornblende gneiss, up to 3 inches in length, make up 10 percent or less of the solum and substratum.

The A horizon has hue of 7.5YR through 2.5Y, value of 3 through 6, and chroma of 2 through 4. It is fine sandy loam, loam, or silt loam. The B horizon has hue of 7.5YR through 10YR, value of 4 or 5, and chroma of 4 through 8. The B2 horizon is clay, silty clay loam, or silty clay. The C horizon is strongly weathered rock that crushes easily to loam, clay loam, or silty clay loam.

Fluvaquents

Fluvaquents in Spotsylvania County consist of deep, poorly drained and somewhat poorly drained soils that formed in sandy to clayey alluvium. They are on flood plains along streams and large drainageways of the Piedmont region and Coastal Plain. The slopes range from 0 to 2 percent.

Fluvaquents are commonly near Altavista, Margo, and Toccoa soils and are more poorly drained than those soils.

Because of the variability of Fluvaquents, a typical pedon is not described. The alluvium generally is more than 5 feet thick. Reaction ranges from strongly acid to extremely acid. Rounded quartz pebbles, 1/4 inch to 3 inches in diameter, make up 0 to 10 percent of the upper 30 inches of the soil and can make up 50 percent or more of the individual layers. Rounded quartz pebbles make up 0 to 75 percent of the soil below a depth of 30 inches. val1The surface layer commonly is less than 16 inches thick. The A horizon is neutral and has value of 4 through 7, or it has value of 7.5YR through 2.5Y, value of 4 through 7, and chroma of 1 through 6. It ranges from loamy sand to clay loam and their gravelly or very gravelly analogs.

The substratum is neutral with value of 4 through 7, or it has hue of 7.5YR through 2.5Y, value of 4 through 7, and chroma of 1. High chroma mottles are common. The substratum is made up of stratified alluvium that ranges from sand to clay. In some places it is gravelly or very gravelly.

Goldsboro series

The Goldsboro series consists of deep, moderately well drained soils that formed in fluviomarine sediment. Goldsboro soils are on toe slopes, at the head of drainageways, and in low areas of the Coastal Plain. The slopes range from 0 to 4 percent.

Goldsboro soils are commonly near Emporia, Savannah, and Suffolk soils and Aquults. They are better drained than Aquults. They are not so well drained as Emporia and Suffolk soils and have a thicker solum than those soils. Unlike Savannah soils, Goldsboro soils do not have a fragipan.

Typical pedon of Goldsboro sandy loam, about 50 feet north of the Route 17 Bypass and 2.5 miles west of New Post:

O1—1 inch to 0; partly decomposed pine needles, leaves, and twigs.
Ap—0 to 12 inches; light brownish gray (10YR 6/2) sandy loam; weak fine granular structure; very friable; many fine and medium roots; 4 percent rounded quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

B21t—12 to 28 inches; brownish yellow (10YR 6/8) sandy clay loam; moderate fine subangular blocky structure; firm, sticky and slightly plastic; many fine roots; few thin clay films on faces of peds; 4 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; very strongly acid; gradual smooth boundary.
B22t—28 to 49 inches; brownish yellow (10YR 6/8) sandy clay loam; common medium distinct light brownish gray (10YR 6/2) and gray (10YR 5/1) mottles; moderate medium subangular blocky structure; firm, sticky and slightly plastic; common fine roots; few thin clay films on faces of peds; 4 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; very strongly acid; clear smooth boundary.
B3t—49 to 62 inches; gray (10YR 5/1) clay loam; many medium and coarse distinct brownish yellow (10YR 6/8) and light olive brown (2.5Y 5/4) mottles; weak coarse subangular blocky structure; firm, sticky and plastic; few thin clay films on faces of peds; 1 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; common fine roots; very strongly acid; clear smooth boundary.
C—62 to 77 inches; gray (10YR 6/1) clay loam; common medium distinct light olive brown (2.5Y 5/4) and brownish yellow (10YR 6/8) mottles; massive; firm, sticky and plastic; few fine roots; 1 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; very strongly acid.

The solum is more than 60 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid to very strongly acid unless lime has been added. Rounded quartz pebbles, up to 2 inches in diameter, make up 0 to 10 percent of the solum and 0 to 50 percent of each layer in the substratum.

The A horizon has hue of 10YR and 2.5Y, value of 4 through 7, and chroma of 1 through 4. It is fine sandy loam, sandy loam, or loamy sand. The B horizon has hue of 10YR or 2.5Y, and value of 5 or 6. It has chroma of 3 through 8 above a depth of 40 inches and 1 through 8 below a depth of 40 inches. The B2 horizon is sandy loam or sandy clay loam. The B3 horizon is sandy loam, sandy clay loam, or clay loam.

Iredell series

The Iredell series consists of deep, moderately well drained to somewhat poorly drained soils that formed in material that weathered from diorite, schist, and similar rocks. Iredell soils are on broad ridges and side slopes of the Piedmont uplands. The slopes range from 2 to 15 percent. Iredell soils are mapped only in a complex with Orange soils in Spotsylvania County.

Iredell soils are commonly near Cullen, Fluvanna, Orange, and Poindexter soils. They are not so well drained as Cullen and Fluvanna soils, and they have a thinner solum and a more plastic subsoil. Iredell soils are less acid than Orange soils and do not have low chroma mottles in the upper part of the B horizon. They have more clay than Poindexter soils and are not so well drained.

Typical pedon of Iredell loam, in an area of Orange-Iredell loams, 2 to 7 percent slopes, about 100 feet south of Route 606, about 1.5 miles west of Post Oak:

Ap—0 to 5 inches; brown (10YR 5/3) loam; moderate fine granular structure; friable; many fine roots; 1 percent angular quartz pebbles 1/4 to 1 inch in diameter; medium acid; abrupt smooth boundary.
B21t—5 to 11 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine and medium subangular blocky structure; very firm, very sticky and very plastic; many fine roots; 1 percent angular quartz pebbles 1/4 to 1 inch in diameter; continuous thin and medium clay films on faces of peds; few fine dark brown concretions; neutral; clear smooth boundary.
B22t—11 to 22 inches; yellowish brown (10YR 5/4) clay; moderate medium subangular blocky structure; very firm, very sticky and very plastic; common fine and medium dark brown concretions; continuous medium clay films on faces of peds; 1 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; mildly alkaline; gradual wavy boundary.
B23t—22 to 30 inches; yellowish brown (10YR 5/4) clay; many medium faint brownish yellow (10YR 6/6) and light gray (10YR 7/1) mottles; weak medium subangular blocky structure; common medium and fine dark brown concretions; few fine flakes of mica; many medium clay films and silt coatings on faces of peds; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; mildly alkaline; gradual irregular boundary.
C—30 to 62 inches; shades of green, gray, yellowish brown, and white loam; massive; friable, slightly sticky and slightly plastic; few fine flakes of mica; few medium and thick clay flows in the upper 16 inches; moderately alkaline.

The solum is 20 to 40 inches thick. Depth to rippable bedrock is more than 40 inches. Reaction is medium acid or slightly acid in the A horizon, slightly acid to mildly alkaline in the B horizon, and neutral to moderately alkaline in the C horizon. Fragments of angular quartz and weathered basic rock make up 0 to 15 percent of the solum.

The A horizon has hue of 10YR through 2.5Y, value of 4 or 5, and chroma of 2 through 4. It is loam, sandy loam, silt loam, or clay loam.

The B horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 3 through 6. It is clay or clay loam. The B22t and B23t horizons have few to many concretions.

The C horizon is multicolored, commonly in shades of green, white, gray, black, yellow, and brown. It is loam,

sandy loam, or clay loam. In some places there are dark brown or black concretions.

Kempsville series

The Kempsville series consists of deep, well drained soils that formed in Coastal Plain sediment of fluviomarine origin (fig. 10). Kempsville soils are on ridgetops and side slopes of the Coastal Plain uplands. The slopes range from 2 to 25 percent.

Kempsville soils are commonly near Bama, Faceville, and Varina soils. Kempsville soils have a thinner solum than Bama soils. They have less clay than Faceville and Varina soils.

Typical pedon of Kempsville gravelly sandy loam, 7 to 15 percent slopes, about 200 feet west of the power line about 0.25 mile north of Route 635, about 2 miles east of the I-95 crossover of Route 635:

O1—2 inches to 0: partly decomposed leaves and twigs.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) gravelly sandy loam; moderate fine granular structure; very friable; many fine roots; 30 percent rounded quartz pebbles 1/4 inch to 3 inches in diameter; very strongly acid; clear smooth boundary.

A2—2 to 13 inches; pale brown (10YR 6/3) gravelly sandy loam; moderate fine and medium granular structure; very friable; many fine and medium roots; 35 percent rounded quartz pebbles 1/4 inch to 3 inches in diameter; very strongly acid; clear smooth boundary.

B1t—13 to 18 inches; brownish yellow (10YR 6/6) gravelly sandy loam; weak fine subangular blocky structure; firm, slightly sticky and slightly plastic; common fine and medium roots; few thin clay films on faces of peds; 30 percent rounded quartz pebbles 1/4 inch to 3 inches in diameter; very strongly acid; clear smooth boundary.

B21t—18 to 33 inches; yellowish red (5YR 5/6) gravelly sandy clay loam; common medium faint strong brown (7.5YR 5/6) and red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few thin clay films on faces of peds; 30 percent rounded quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; gradual smooth boundary.

B3t—33 to 44 inches; strong brown (7.5YR 5/6) gravelly sandy clay loam; many medium distinct yellowish red (5YR 4/8) and brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few thin clay films on faces of peds; few fine roots; 37 percent rounded quartz pebbles 1/4 to 1 inch in diameter; strongly acid; gradual smooth boundary.

C—44 to 63 inches; yellowish brown (10YR 5/6), brownish yellow (10YR 6/6), and reddish yellow (5YR 6/6) gravelly sandy clay loam; very friable; slightly sticky and slightly plastic; few fine roots; 30 percent rounded quartz pebbles 1/4 inch to 3 inches in diameter; strongly acid.

Figure 10.—An excavation in an area of Kempsville gravelly sandy loam, 7 to 15 percent slopes. Stratified Coastal Plain sediment underlies the soil.

In most places the solum is 30 to 50 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Rounded quartz pebbles, 1/4 inch to 3 inches in diameter, make up 20 to 35 percent of the solum. Some individual subhorizons are up to 50 percent quartz pebbles.

The A horizon has hue of 10YR, value of 3 through 7, and chroma of 2 through 6. The A1 horizon has value of 3 and chroma of 2 or 3. The A horizon is gravelly sandy loam or gravelly loam.

The B horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 4 through 8. It is gravelly sandy clay loam, gravelly clay loam, or gravelly sandy

loam. In some places there are few fragments of reddish sandstone.

The C horizon is multicolored, stratified sediment. It ranges from gravelly sand to gravelly clay. In some places there are few to many fragments of reddish sandstone.

The Kempsville soils in Spotsylvania County are a taxadjunct to the Kempsville series because they have a thinner solum than that defined for the series.

LaRoque series

The LaRoque series consists of moderately deep, well drained soils that formed mainly in material that weathered from sericite schist and some granitic material. LaRoque soils are on ridgetops and side slopes of the Piedmont uplands. The slopes range from 7 to 55 percent.

LaRoque soils are commonly near Brockroad, Catharpin, Margo, Nason, Tatum, and Toddstav soils. They have a thinner solum and less clay than Brockroad, Catharpin, Tatum, and Nason soils. They are better drained than Margo and Toddstav soils.

Typical pedon of LaRoque loam, 15 to 25 percent slopes, about 250 feet southwest of Route 610, about 0.25 mile southeast of Elys Ford:

A1—0 to 2 inches; dark grayish brown (10YR 4/2) loam; moderate fine granular structure; very friable; many fine and medium roots; 8 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

A2—2 to 7 inches; light yellowish brown (10YR 6/4) loam; moderate fine granular structure; very friable; many fine and medium roots; 3 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

B2t—7 to 14 inches; reddish yellow (7.5YR 6/6) loam; moderate fine and medium subangular blocky structure; friable, slightly plastic; many fine and medium roots; few thin clay films on faces of peds; 3 percent angular quartz pebbles 1/4 inch to 3 inches in diameter; many very fine flakes of mica; very strongly acid; clear smooth boundary.

C—14 to 34 inches; yellowish brown (10YR 5/8) loam; many medium distinct reddish yellow (7.5YR 7/6) and yellowish red (5YR 4/8) mottles; massive; very friable; 3 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; many very fine flakes of mica; very strongly acid; gradual smooth boundary.

Cr—34 to 60 inches; yellowish brown (10YR 5/8), red (2.5YR 4/6), and white (10YR 8/1) weathered mica schist that crushes with difficulty to loam; firm in place; many very fine flakes of mica; very strongly acid.

The solum is 12 to 24 inches thick. Depth to rippable bedrock is 20 to 40 inches. Reaction is very strongly acid or extremely acid unless lime has been added. Angular quartz pebbles, 1/4 inch to 3 inches in diameter, and fragments of partly weathered schist, 1 inch to 3 inches long, make up 0 to 15 percent of the A horizon and 0 to 5 percent of the subsoil.

The A horizon has hue of 7.5YR through 2.5Y, value of 2 through 7, and chroma of 1 through 6. It is loam or silt loam. The B horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. It is silt loam, loam, clay loam, or silty clay loam. In some places there are thin B1 and B3 horizons. The C horizon is strongly weathered sericite schist that grades to partly weathered schist. It is commonly loam or sandy loam.

Louisburg series

The Louisburg series consists of moderately deep, well drained soils that formed in material that weathered from granite and granitic material. Louisburg soils are on ridgetops and side slopes of the Piedmont uplands. The slopes range from 7 to 50 percent.

Louisburg soils are commonly near Appling, Cecil, Margo, Pacolet, and Toddstav soils. They have a thinner solum and less clay than Appling, Cecil, and Pacolet soils. They are better drained than Margo and Toddstav soils.

Typical pedon of Louisburg sandy loam, 15 to 25 percent slopes, about 50 feet south of Route 618, about 1.5 miles west of Motts Run:

O1—1 inch to 0: partly decomposed leaves and twigs.

A1—0 to 1 inch; grayish brown (10YR 5/2) sandy loam; moderate fine granular structure; very friable; many fine roots; 12 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

A2—1 inch to 11 inches; pale brown (10YR 6/3) sandy loam; moderate fine granular structure; very friable; many fine roots; 10 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

B2t—11 to 18 inches; strong brown (7.5YR 5/8) sandy clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few thin clay films on faces of peds; 10 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; common fine flakes of mica; very strongly acid; clear smooth boundary.

C—18 to 27 inches; strong brown (7.5YR 5/8), reddish yellow (5YR 6/8), yellowish red (5YR 4/8), and yellow (10YR 7/6) sandy loam; massive; very friable; 12 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; common fine flakes of mica; strongly acid; gradual smooth boundary.

Cr—27 to 36 inches; partly weathered granite gneiss.

The solum is about 15 to 30 inches thick. Depth to hard bedrock is more than 48 inches. Reaction is strongly acid to very strongly acid unless lime has been added. The content of angular quartz pebbles and fragments of partly weathered granite gneiss ranges from 0 to 25 percent in the A horizon and 0 to 15 percent in the B horizon.

The A horizon has hue of 10YR through 2.5Y, value of 3 through 6, and chroma of 2 through 6. It is loam, silt loam, or sandy loam. The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 4 through 8. It is silt loam, loam, clay loam, silty clay loam, or sandy clay loam. In some places there is a Bt horizon. The C horizon is strongly weathered granite or granite gneiss and is 10 to 50 percent fragments of rock.

The Louisburg soils in Spotsylvania County are a taxadjunct to the Louisburg series because they have a thinner solum and more clay and less sand in the control section than that defined as the range for the series. They also have a continuous argillic horizon.

Margo series

The Margo series consists of deep, moderately well drained soils that formed in alluvium from surrounding upland soils. Margo soils are on toe slopes, in depressions, and along drainageways of the Piedmont uplands. The slopes range from 2 to 7 percent.

Margo soils are commonly near Catharpin, LaRoque, and Tatum soils and Aquults, loamy. They are better drained than Aquults, loamy, and are not so well drained as Catharpin, LaRoque, and Tatum soils. Margo soils have less clay than Catharpin and Tatum soils and a thicker solum than LaRoque soils.

Typical pedon of Margo loam, 2 to 7 percent slopes, about 70 yards west of Route 659 and about 1.75 miles north of the junction of Routes 659 and 208:

O1—1 inch to 0; undecomposed and partly decomposed leaves and twigs.

A1—0 to 1 inch; very dark grayish brown (10YR 3/2) loam; moderate fine granular structure; very friable; many fine and medium roots; 2 percent angular quartz pebbles 1/2 inch to 2 inches in diameter; few very fine flakes of mica; very strongly acid; clear smooth boundary.

A2—1 inch to 9 inches; light yellowish brown (10YR 6/4) loam; moderate fine granular structure; very friable; many fine and medium roots; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; few very fine flakes of mica; very strongly acid; clear smooth boundary.

B21t—9 to 17 inches; yellowish brown (10YR 5/6) loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; 1 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; few thin clay films on faces of peds; many very fine flakes of mica; very strongly acid; gradual smooth boundary.

B22t—17 to 31 inches; light olive brown (2.5Y 5/6) clay loam; many fine and medium distinct light brownish gray (10YR 6/2) mottles; friable, slightly sticky and slightly plastic; common thin clay films and silt coatings on faces of peds; 1 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; many very fine flakes of mica; strongly acid; clear smooth boundary.

B23t—31 to 42 inches; light olive brown (2.5Y 5/6) clay loam; common medium and coarse prominent light gray (10YR 6/1) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common thin clay films and silt coatings on faces of peds; 1 percent angular quartz pebbles 1/2 inch to 3 inches in diameter; many very fine flakes of mica; strongly acid; abrupt smooth boundary.

IIB24t—42 to 45 inches; light olive brown (2.5Y 5/6) gravelly clay loam; common medium and coarse prominent light gray (10YR 6/1) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common thin clay films and silt coatings on faces of peds and coarse fragments; 20 percent angular quartz pebbles 1/4 inch to 3 inches in diameter; many very fine flakes of mica; strongly acid; abrupt smooth boundary.

IIIC—45 to 60 inches; brownish yellow (10YR 6/6) sandy loam; many medium and coarse red (2.5Y 5/8) and gray (10YR 5/1) mottles; massive; very friable; few thin clay flows in the upper part; many fine and very fine flakes of mica; strongly acid.

The solum is 30 to 60 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Angular quartz pebbles, 1/4 inch to 3 inches in diameter, make up 0 to 5 percent of the upper part of the solum and 15 to 35 percent of the IIB horizon.

The A horizon has hue of 7.5YR through 2.5Y, value of 2 through 7, and chroma of 2 through 4. It is loam or silt loam.

The Bt horizon has hue of 7.5YR through 2.5Y, value of 5 through 7, and chroma of 3 through 8. It is loam, silt loam, silty clay loam, or clay loam. In some places the lower part of the B horizon is dominantly gray (10YR 5/1, 6/1). Rock lines of angular quartz pebbles are at a depth of 36 to 45 inches in some places. Fine or very fine flakes of mica are few to many.

The C horizon is multicolored, strongly weathered sericite schist. The C horizon is commonly sandy loam or loam.

Marlboro series

The Marlboro series consists of deep, well drained soils that formed in fluviomarine sediment. Marlboro soils are on ridgetops and side slopes of the Coastal Plain uplands. The slopes range from 2 to 15 percent. Marlboro soils are mapped only in a complex with Faceville soils.

Marlboro soils are commonly near Emporia, Faceville, Goldsboro, and Savannah soils. They have a browner subsoil than Faceville soils. They have more clay than Emporia and Goldsboro soils and are better drained than Goldsboro soils. Unlike Savannah soils, Marlboro soils do not have a fragipan.

Typical pedon of Marlboro fine sandy loam, in an area of Faceville-Marlboro complex, 2 to 7 percent slopes, 15 yards west of Route 646 and about 1 mile south of Route 645:

A1—0 to 2 inches; dark grayish brown (10YR 4/2) fine sandy loam; moderate fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

A2—2 to 15 inches; pale brown (10YR 6/3) fine sandy loam; moderate fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

B1t—15 to 18 inches; brownish yellow (10YR 6/6) sandy clay loam; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; few thin clay films on faces of peds; very strongly acid; clear smooth boundary.

B21t—18 to 43 inches; yellowish brown (10YR 5/6) clay; moderate fine subangular blocky structure; firm, sticky and plastic; common fine roots; few thin clay films on faces of peds; 1 percent rounded pebbles 1/4 to 1/2 inch in diameter; strongly acid; clear smooth boundary.

B22t—43 to 60 inches; strong brown (7.5YR 5/8) clay; common medium faint yellowish red (5YR 5/8) and brownish yellow (10YR 6/6) mottles; moderate fine and medium subangular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films on faces of peds; 1 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; strongly acid.

The solum is more than 60 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Ironstone pebbles, 1/4 to 1/2 inch in diameter, make up 0 to 4 percent of the solum.

The A1 or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. The A2 horizon has hue of 10YR or 2.5YR, value of 6, and chroma of 3 or 4. The A horizon is sandy loam or fine sandy loam.

The B1t horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 8. It is sandy loam or sandy clay loam. The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 8. It is clay, clay loam, or sandy clay.

In some places there is a C horizon. It ranges from clay to sand and is 0 to 50 percent rounded pebbles. In the western part of the Coastal Plain the substratum is weathered bedrock.

Masada series

The Masada series consists of deep, well drained soils. Masada soils formed in older alluvium in areas that are higher than the flood plains and are commonly some distance from them. The soils are on ridgetops and side slopes of the Piedmont uplands. The slopes range from 2 to 15 percent.

Masada soils are commonly near Appling, Cecil, Nason, Tatum, and Turbeville soils. They have a thicker solum than Appling and Nason soils, and they have a browner subsoil than Cecil, Tatum, and Turbeville soils.

Typical pedon of Masada loam, 2 to 7 percent slopes, about 0.25 mile north of Route 618 and about 2.25 miles east of Doswell Chapel:

Ap—0 to 10 inches; dark yellowish brown (10YR 4/4) loam; moderate fine granular structure; very friable; many fine roots; 2 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; neutral; clear smooth boundary.

B1t—10 to 14 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; firm, sticky and slightly plastic; common fine roots; few thin clay films on faces of peds; 3 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; few fine flakes of mica; neutral; clear smooth boundary.

B21t—14 to 32 inches; strong brown (7.5YR 5/8) clay; moderate fine subangular blocky structure; firm, sticky and plastic; few fine roots; many thin clay films on faces of peds; 2 percent rounded pebbles 1/4 to 1/2 inch in diameter; few fine flakes of mica; strongly acid; clear smooth boundary.

B22t—32 to 62 inches; strong brown (7.5YR 5/8) clay; moderate fine subangular blocky structure; firm, sticky and plastic; few fine roots; common thin and medium clay films on faces of peds; 3 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; few fine flakes of mica; strongly acid; gradual smooth boundary.

C—62 to 75 inches; strong brown (7.5YR 5/8), brownish yellow (10YR 6/6), and red (2.5YR 5/6) clay loam; massive; firm, sticky and slightly plastic; 3 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; common fine flakes of mica; strongly acid.

The solum is 40 to more than 60 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Rounded quartz pebbles, 1/4 inch to 2 inches in

diameter, make up 0 to 15 percent of the solum and 0 to 60 percent of the substratum. Mica flakes are few to common in the B and C horizons.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 1 through 6. It is loam, fine sandy loam, or sandy loam.

The B1 horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 4 through 8. It is loam, clay loam, or sandy clay loam. The B2 horizon has hue of 2.5YR through 10YR, value of 4 through 6, and chroma of 6 or 8. The B2 horizon is clay loam or clay. In some places there are high and low chroma mottles in the B22t horizon.

The C horizon is multicolored. It is sandy loam to clay loam or their gravelly or very gravelly analogs.

Mattaponi series

The Mattaponi series consists of deep, moderately well drained soils that formed in fluviomarine sediment. Mattaponi soils are on ridgetops and side slopes of the Coastal Plain. The slopes range from 2 to 15 percent.

Mattaponi soils are commonly near Faceville, Kempsville, and Savannah soils and Aquults. They are better drained than Aquults. They are not so red in the subsoil as Faceville soils and have more clay than Kempsville and Savannah soils. Unlike Savannah soils, Mattaponi soils do not have a fragipan.

Typical pedon of Mattaponi sandy clay loam, 7 to 15 percent slopes, eroded, about 500 yards north of State Route 668 and about 600 yards northeast of the junction of State Route 668 and the Spotsylvania-Caroline County line:

O1—1 inch to 0; partly decomposed leaves and twigs.

Ap—0 to 8 inches; brown (10YR 4/3) sandy clay loam; moderate fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

B1t—8 to 14 inches; brownish yellow (10YR 6/6) sandy clay loam; moderate fine subangular blocky structure; friable, sticky and slightly plastic; common fine roots; few thin clay films on faces of peds; very strongly acid; clear smooth boundary.

B21t—14 to 29 inches; reddish yellow (7.5YR 6/8) clay; moderate fine and medium subangular blocky structure; firm, sticky and plastic; common fine roots; common thin clay films on faces of peds; very strongly acid; clear smooth boundary.

B22t—29 to 34 inches; yellowish brown (10YR 5/6) clay; moderate medium and fine subangular blocky structure; firm, sticky and plastic; common fine roots; common thin clay films on faces of peds; very strongly acid; clear smooth boundary.

B23t—34 to 44 inches; brownish yellow (10YR 6/6) clay; many medium and coarse distinct light gray (10YR 7/1) and red (2.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common medium clay films on faces of peds; very strongly acid; clear smooth boundary.

C1—44 to 56 inches; yellowish brown (10YR 5/6) clay; many medium distinct red (2.5YR 4/6) and white (10YR 8/1) mottles; massive; very firm, sticky and very plastic; very strongly acid; abrupt smooth boundary.

C2—56 to 68 inches; brownish yellow (10YR 6/6) sandy loam; many medium distinct gray (10YR 7/2) and white (10YR 8/1) mottles; massive; firm; 10 percent rounded quartz pebbles 1/4 inch to 3 inches in diameter; very strongly acid.

The solum is 40 to more than 60 inches thick. Rounded quartz pebbles, 1/4 inch to 3 inches in diameter, make up 0 to 10 percent of the solum and 0 to 60 percent of the substratum. Reaction is strongly acid or very strongly acid unless lime has been added.

The A horizon has hue of 10YR or 7.5YR, value of 3 through 7, and chroma of 2 through 8. It is sandy loam, loam, silt loam, or sandy clay loam. If eroded, it is sandy clay loam, clay loam, or clay. The Bt horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. The Bt horizon is clay loam, sandy clay loam, or clay. The C horizon is mottled. It is loamy sand to clay or the gravelly or very gravelly analogs.

Nason series

The Nason series consists of deep, well drained soils that formed in material that weathered from mica schist. Nason soils are on ridgetops and side slopes of the Piedmont uplands. The slopes commonly range from 2 to 25 percent.

Nason soils are commonly near Brockroad, Catharpin, LaRoque, and Tatum soils. Nason soils have a thinner solum than Brockroad and Catharpin soils and a browner subsoil than Catharpin and Tatum soils. They have more clay than LaRoque soils.

Typical pedon of Nason silt loam, 7 to 15 percent slopes, eroded, about 100 yards south of the old railroad tracks on the south side of Route 621 and about 1.5 miles east of Parker:

O1—1 inch to 0; partly decomposed pine needles, leaves, and twigs.

A1—0 to 2 inches; dark gray (10YR 4/1) silt loam; moderate fine granular structure; very friable; many fine roots; 2 percent angular quartz pebbles 1/4 inch to 1 1/2 inches in diameter; very strongly acid; clear smooth boundary.

A2—2 to 7 inches; yellowish brown (10YR 5/4) silt loam; moderate fine granular structure; very friable; many fine and medium roots; common very fine flakes of mica; 2 percent thin fragments of weathered schist and angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

B1t—7 to 11 inches; yellowish brown (10YR 5/8) silty clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; few thin clay films on faces of peds; common very fine flakes of mica; 2 percent angular quartz and weathered schist pebbles 1/4 inch to 2 inches in diameter; strongly acid; clear smooth boundary.

B21t—11 to 27 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm, slightly sticky and slightly plastic; common fine roots; continuous thin clay films on faces of peds; 2 percent thin fragments of weathered schist 1 inch to 3 inches across; many very fine flakes of mica; strongly acid; gradual smooth boundary.

B22t—27 to 35 inches; strong brown (7.5YR 5/8) clay; moderate medium subangular blocky structure; firm, plastic; few fine roots; many thin and medium clay films on faces of peds; 10 percent thin fragments of weathered schist 1 inch to 3 inches across; many very fine flakes of mica; strongly acid; gradual smooth boundary.

C—35 to 55 inches; shades of brown, red, yellow, and white silt loam; massive; very friable; 20 percent fine and medium fragments of partly weathered schist; many very fine flakes of mica; strongly acid; abrupt wavy boundary.

Cr—55 to 69 inches; soft, strongly weathered mica schist.

The solum is 25 to 50 inches thick. Depth to soft bedrock is 40 to 60 inches. Reaction is strongly acid or very strongly acid unless lime has been added. Angular quartz pebbles, 1/4 inch to 2 inches in diameter, make up 0 to 15 percent of the surface layer and 0 to 3 percent of the subsoil and substratum. Fragments of partly weathered schist, 1 inch to 3 inches across, make up 0 to 10 percent of the lower part of the subsoil and 2 to 30 percent of the substratum.

The A1 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 1 or 2. The A2 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 6. The A horizon is silt loam or loam.

The Bt horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 4 through 8. It is silty clay loam, clay, or silty clay.

The C horizon is multicolored in shades of red, brown, yellow, and white. It is loam or silt loam.

The Cr horizon is at a depth of more than 50 inches. It is partly weathered sericite schist and is soft. In some pedons there is no Cr horizon.

Orange series

The Orange series consists of deep, somewhat poorly drained to moderately well drained soils. Orange soils formed in material that weathered from hornblende gneiss and other basic rocks. These soils are on broad ridgetops and side slopes of the Piedmont uplands. The slopes range from 2 to 15 percent.

Orange soils are commonly near Cullen, Fluvanna, Iredell, and Poindexter soils. They are more poorly drained than Cullen, Fluvanna, and Poindexter soils and have more clay than Poindexter soils. Unlike Iredell soils, Orange soils have low chroma mottles in the upper part of the B horizon. Orange soils are more acid than Iredell soils.

Typical pedon of Orange loam, in an area of Orange-Iredell loams, 2 to 7 percent slopes, about 50 feet east of Route 648 and about 2 miles south of Route 608:

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam; moderate fine granular structure; very friable; many fine roots; 2 percent fine angular quartz pebbles 1/4 to 1/2 inch in diameter; strongly acid; abrupt smooth boundary.

B21t—6 to 21 inches; yellowish brown (10YR 5/8) clay; common medium prominent light brownish gray (2.5Y 6/2) and light gray (10YR 7/1) mottles; moderate medium and coarse subangular blocky structure; very firm, very sticky and very plastic; common fine roots; many medium clay films and pressure faces on surfaces of peds; common fine brown concretions; medium acid; clear smooth boundary.

B22t—21 to 43 inches; light olive brown (2.5Y 5/4) clay; common medium and coarse distinct light brownish gray (2.5Y 6/2) and light gray (2.5Y 7/2) mottles; moderate coarse angular blocky structure; very firm, sticky and very plastic; few fine roots; many medium clay films and pressure faces on surfaces of peds; many fine and medium black concretions; medium acid; gradual smooth boundary.

C—43 to 65 inches; light olive brown (2.5Y 5/6) sandy clay loam; many medium and coarse distinct light brownish gray (2.5Y 5/2) and light gray (5Y 7/2) mottles; massive; firm, sticky and plastic; few fine roots; 10 percent strongly weathered fragments of hornblende gneiss and other basic rock; many dark brown and black concretions; medium acid.

The solum is 20 to more than 40 inches thick. Depth to hard bedrock is more than 40 inches. Angular quartz pebbles, 1/4 inch to 3 inches in diameter, make up 0 to 10 percent of the solum. Reaction is strongly acid or medium acid in the upper part of the solum unless lime has been added. It is medium acid to moderately alkaline in the lower part of the B horizon and in the C horizon.

The A horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 4. It is loam, silt loam, or fine sandy loam.

The Bt horizon has hue of 7.5YR through 5Y, value of 4 through 6, and chroma of 4 through 8. It is clay, clay loam, silty clay loam, or silty clay.

The C horizon is multicolored in shades of green, yellow, brown, gray, and white. It is loam, sandy loam, silt loam, or sandy clay loam. In some places there is a Cr horizon that has colors similar to the C horizon. The Cr horizon is partly weathered basic igneous and metamorphic rock that crushes to loam or silt loam.

Pacolet series

The Pacolet series consists of deep, well drained soils. Pacolet soils formed in material that weathered from granite, granite gneiss, and schist. They are on ridgetops and side slopes of the Piedmont uplands. The slopes commonly range from 7 to 25 percent. Pacolet soils are mapped only in a complex with Cecil soils.

Pacolet soils are commonly near Abell, Appling, Cecil, and Partlow soils. Pacolet soils are better drained than Abell and Partlow soils. They have a redder subsoil than Appling soils, and they have a thinner solum than Cecil soils.

Typical pedon of Pacolet sandy loam, in an area of Cecil-Pacolet complex, 7 to 15 percent slopes, eroded, about 2 miles south of Hams Ford and about 50 feet west of Route 617:

Ap—0 to 7 inches; reddish brown (5YR 4/4) sandy loam; moderate fine granular structure; friable; many fine and medium roots; 10 percent angular quartz pebbles 1/4 to 1 inch in diameter; few fine flakes of mica; very strongly acid; clear smooth boundary.

B2t—7 to 17 inches; red (2.5YR 4/6) clay; moderate fine subangular blocky structure; firm, sticky and plastic; common fine roots; many medium clay films on faces of peds; 3 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; common fine flakes of mica; strongly acid; clear smooth boundary.

B3t—17 to 27 inches; red (2.5YR 4/6) clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; common thin and medium clay films on faces of peds; few fragments of strongly weathered gneiss; 3 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; strongly acid; gradual irregular boundary.

C1—27 to 36 inches; yellowish red (5YR 5/8) clay loam; many medium distinct white (10YR 8/1) and yellowish brown (10YR 5/6) mottles; massive; friable; strongly weathered granite gneiss; common medium clay flows in crevices; common fine flakes of mica; strongly acid; gradual smooth boundary.

C2—36 to 64 inches; multicolored in shades of red, white, brown, and yellow loam; massive; very friable; many fine flakes of mica; strongly acid.

The solum is 20 to 40 inches thick. Depth to hard bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Angular quartz pebbles make up 0 to 15 percent of the surface layer and 0 to 5 percent of the subsoil and substratum. There are few to many mica flakes in the B and C horizons.

The A horizon has hue of 10YR through 5YR, value of 4 through 6, and chroma of 3 through 8. It is sandy loam, fine sandy loam, or sandy clay loam. The Bt horizon has hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 or 8. It is clay or clay loam. The C horizon is multicolored in shades of red, yellow, brown, and white. It is sandy loam, loam, sandy clay loam, or clay loam.

Partlow series

The Partlow series consists of deep, poorly drained soils that formed in alluvium from surrounding upland soils. Partlow soils are underlain by granite, granite gneiss, and schist. They are in depressions, on toe slopes, and along drainageways in the Piedmont region. The slopes range from 0 to 7 percent.

Partlow soils are commonly near Abell, Appling, Cecil, and Colfax soils and are more poorly drained than those soils. Partlow soils have less clay than Appling and Cecil soils. Unlike Colfax soils, Partlow soils do not have a fragipan.

Typical pedon of Partlow sandy loam, 0 to 7 percent slopes, 2.5 miles south of Chancellor and 330 yards south of the end of State Route 625:

O1—1 inch to 0; undecomposed and partly decomposed leaves and twigs.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; 5 percent angular quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.

A2—2 to 14 inches; light brownish gray (10YR 6/2) sandy loam; few fine distinct yellowish red (5YR 4/6) mottles; moderate fine granular structure; very friable; many fine and medium roots; common fine flakes of mica; 5 percent angular quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.

B1tg—14 to 21 inches; gray (10YR 5/1) sandy loam; few medium distinct strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; friable, slightly plastic; many fine roots; few thin clay films on faces of peds; clay bridges between sand grains; common fine flakes of mica; 2 percent angular quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.

B21tg—21 to 39 inches; light gray (10YR 6/1) sandy clay loam; few medium distinct brownish yellow (10YR 6/6) mottles; friable, slightly sticky and slightly plastic; common fine roots; common thin clay films on faces of peds; common fine flakes of mica; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

B22tg—39 to 55 inches; light gray (N 7/) sandy clay loam; few medium distinct olive yellow (2.5Y 6/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; thin common clay films on faces of peds; 3 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; common fine flakes of mica; strongly acid; abrupt smooth boundary.

IICg—55 to 70 inches; light gray (N 7/) sandy loam; many medium distinct strong brown (7.5YR 5/6) and brownish yellow (10YR 6/6) mottles; massive; firm in place, very friable when displaced; common medium clay flows in the upper part; strongly acid.

The solum is 40 to more than 60 inches thick. Depth to bedrock is more than 5 feet. Angular quartz pebbles, 1/4 inch to 2 inches in diameter, make up 1 to 15 percent of the solum. Reaction is strongly acid or very strongly acid unless lime has been added.

The A horizon is neutral and has value of 2 through 7, or it has hue of 10YR or 2.5Y, value of 2 through 7, and chroma of 1 through 3. Only the A1 horizon has value of 2 or 3. In some places there are high chroma mottles. The A horizon is coarse sandy loam, sandy loam, or loam.

The Bt horizon is neutral and has value of 4 through 7, or it has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 1 or 2. It is mottled sandy loam, sandy clay loam, or clay loam.

The color of the C horizon is variable and commonly is shades of gray, olive, yellow, and brown. It is sandy loam, sandy clay loam, or loam. In some places there is a stone line at the upper boundary of the weathered bedrock.

Poindexter series

The Poindexter series consists of moderately deep, well drained soils. Poindexter soils formed in material that weathered from hornblende gneiss and other basic rocks. They are on ridges and side slopes of the Piedmont uplands. The slopes commonly range from 7 to 60 percent.

Poindexter soils are commonly near Cullen, Fluvanna, Iredell, and Orange soils and have less clay than those soils. Poindexter soils have a thinner solum than Cullen and Fluvanna soils. They are better drained than Iredell and Orange soils.

Typical pedon of Poindexter loam, 15 to 25 percent slopes, on the north side of the Po River about 2 miles south of Todds Tavern, 1 mile west of Route 649, at the end of subdivision road:

A1—0 to 1 inch; very dark grayish brown (10YR 3/2) loam; moderate fine granular structure; very friable; many fine and medium roots; 4 percent angular quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.

A2—1 to 6 inches; light olive brown (2.5Y 5/4) loam; moderate fine granular structure; very friable; many fine and medium roots; few brown concretions; 8 percent angular quartz pebbles 1/4 to 1 inch in diameter; strongly acid; clear smooth boundary.

B1t—6 to 11 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; few thin clay films on faces of peds; many fine and medium roots; 4 percent angular quartz pebbles 1/4 to 1 inch in diameter; few fragments of weathered gneiss; strongly acid; clear smooth boundary.

B2t—11 to 15 inches; strong brown (7.5YR 5/8) clay loam; moderate fine subangular blocky structure; firm, slightly sticky and plastic; many fine roots; continuous thin and medium clay films on faces of peds; many fine and medium dark brown and black concretions; few fragments of weathered gneiss; 3 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; strongly acid; clear smooth boundary.

C—15 to 27 inches; strong brown (7.5YR 5/8), olive brown (2.5Y 5/6), and brownish yellow (10YR 6/6) sandy clay loam; massive; very friable; common fine roots; 10 percent fragments of weathered gneiss and vein quartz; strongly acid; clear irregular boundary.

Cr—27 to 45 inches; multicolored weathered hornblende gneiss that crushes easily to loam and sandy loam; 30 percent hard fragments; strongly acid.

R—45 inches; bedrock.

The solum is 14 to 28 inches thick. Depth to partially weathered gneiss is 20 to 40 inches, and depth to hard bedrock is more than 40 inches. Fragments of weathered gneiss and angular quartz pebbles, 1/4 inch to 3 inches in diameter, make up 3 to 15 percent of the solum and 40 percent or more of the C horizon. Reaction ranges from strongly acid to slightly acid unless lime has been added.

The A horizon has hue of 7.5YR through 2.5Y, value of 3 through 6, and chroma of 2 through 4. It is loam, silt loam, sandy clay loam, or clay loam. The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 4 through 8. It is loam, sandy clay loam, or clay loam. In some places there are thin layers of clay, and in some places there is a B3 horizon. The C horizon is commonly strongly weathered hornblende gneiss or other basic rock that crushes to loam, sandy loam, clay loam, silt loam, or silty clay loam.

Savannah series

The Savannah series consists of deep, moderately well drained soils that formed in stratified Coastal Plain sediment. Savannah soils are on broad ridgetops and on side slopes of the Coastal Plain uplands. The slopes range from 0 to 7 percent.

Savannah soils are commonly near Emporia, Faceville, Goldsboro, Mattaponi, and Partlow soils. Unlike Savannah soils, none of these soils have a fragipan. Savannah soils have less clay in the subsoil than Faceville and Mattaponi soils and are better drained than Partlow soils.

Typical pedon of Savannah sandy loam, 2 to 7 percent slopes, about 75 feet north of Route 610 and about 0.5 mile east of the junction of Routes 610 and 674:

Ap—0 to 11 inches; dark grayish brown (10YR 4/2) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

B1t—11 to 15 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; common clay films bridging and coating sand grains; 1 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.

B2t—15 to 22 inches; brownish yellow (10YR 6/6) sandy clay loam; common fine and medium pale brown (10YR 6/3) mottles in the lower 2 inches; weak fine subangular blocky structure; friable, sticky and slightly plastic; common fine roots; few thin clay films on faces of peds; 1 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; abrupt smooth boundary.

Bx1—22 to 31 inches; brownish yellow (10YR 6/6) fine sandy loam; many fine and medium distinct light brownish gray (10YR 6/2) mottles; moderate thin platy structure; firm, brittle and compact; many fine pores; few fine roots in polygonal cracks; many thin clay films on horizontal faces of peds; 12 inch polygonal cracks filled with gray clay up to 1/2 inch thick; 1 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; gradual smooth boundary.

Bx2—31 to 39 inches; strong brown (7.5YR 5/6) sandy clay loam; common coarse distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; moderate medium platy structure; firm, sticky and slightly plastic; few fine pores; common thin clay films on horizontal faces of peds; polygonal cracks filled with light gray clay up to 1/2 inch thick; very strongly acid; gradual smooth boundary.

B3t—39 to 64 inches; strong brown (10YR 5/6) clay loam; common medium faint yellowish red (5YR 5/8) and red (2.5YR 5/6) mottles; weak fine subangular blocky structure; firm, sticky and slightly plastic; common thin clay films on faces of peds; very strongly acid; gradual smooth boundary.

C—64 to 79 inches; mottled red (2.5YR 4/6), yellow (10YR 7/6), and gray (10YR 6/1) clay loam; massive; firm, very sticky and slightly plastic; 2 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid.

The solum is 50 to more than 80 inches thick. Depth to bedrock is more than 5 feet. Depth to the fragipan is about 16 to 28 inches. Reaction is strongly acid or very strongly acid unless lime has been added. Rounded quartz pebbles, 1/4 inch to 2 inches in diameter, make up 0 to 15 percent of the solum. The solum is commonly underlain by Coastal Plain sediment, and in some places it is underlain by weathered bedrock. In some places there are plinthite nodules in the lower part of the subsoil.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is sandy loam, fine sandy loam, loam, or silt loam.

The B1t and B2t horizons have hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. There are mottles that have chroma of 3 or less in the lower part of the B2t horizon. The B1t and B2t horizons are sandy clay loam, clay loam, or loam.

The Bx horizon has hue of 7.5YR through 2.5Y, value of 5 through 7, and chroma of 2 through 8. It is sandy loam, fine sandy loam, or sandy clay loam.

The B3t horizon has hue of 7.5YR through 2.5Y, value of 5, and chroma of 6 or 8. It has high and low chroma mottles. It is loam, fine sandy loam, sandy clay loam, or clay loam.

The C horizon ranges from gravelly sand to clay. In some places in the western part of the Coastal Plain, the lower part of the substratum is strongly weathered bedrock.

Spotsylvania series

The Spotsylvania series consists of deep, well drained soils. Spotsylvania soils formed in a layer of fluviomarine sediment and in the underlying material that weathered from granite, granite gneiss, and schist. Spotsylvania soils are on ridgetops and side slopes of uplands, mostly along the eastern edge of the Piedmont region. The slopes range from 2 to 15 percent.

Spotsylvania soils are commonly near Appling, Cecil, Faceville, and Savannah soils. Unlike those soils, Spotsylvania soils have a lithologic discontinuity, and they are not so red in the subsoil as Cecil and Faceville soils. Unlike Savannah soils, Spotsylvania soils do not have a fragipan.

Typical pedon of Spotsylvania fine sandy loam, 2 to 7 percent slopes, about 1 mile east of Snell, about 1.5 miles north of State Route 606, and 70 yards east of State Route 722 on the east side of a private drive:

O1—1 inch to 0; partly decomposed pine needles, oak leaves, and twigs.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; 2 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.

A2—2 to 10 inches; light yellowish brown (10YR 6/4) fine sandy loam; moderate fine granular structure; very friable; many fine and medium roots; 2 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.

B1t—10 to 19 inches; yellowish brown (10YR 5/6) clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and medium roots; few thin clay films on faces of peds; 2 percent rounded quartz pebbles 1/4 inch to 1 1/2 inches in diameter; very strongly acid; clear smooth boundary.

B21t—19 to 31 inches; strong brown (7.5YR 5/6) clay; common medium and coarse faint yellowish red (5YR 5/6) and brownish yellow (10YR 6/8) mottles; moderate fine subangular blocky structure; firm; common fine and medium roots; thin continuous clay films on faces of peds; 2 percent rounded quartz pebbles 1/4 to 1 inch in diameter; stone line 2 inches thick, at the lower boundary, that is 15 percent rounded and subrounded quartz pebbles up to 2 inches in diameter; very strongly acid; abrupt smooth boundary.

IIB22t—31 to 41 inches; yellowish red (5YR 5/6) clay; common medium and fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm, slightly sticky and plastic; thin continuous clay films on faces of peds; 5 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; few fine flakes of mica; very strongly acid; clear smooth boundary.

IIB3t—41 to 54 inches; yellowish red (5YR 5/6) clay; common medium and coarse faint yellowish brown (10YR 5/6) mottles and few medium and coarse prominent white (10YR 8/1) mottles; firm, slightly sticky and slightly plastic; common medium clay films on faces of peds; common fine flakes of mica; 2 percent fragments of weathered feldspar; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; gradual smooth boundary.

IIC—54 to 74 inches; red (2.5YR 5/8), strong brown (7.5YR 5/6), white (10YR 8/1), and brownish yellow (10YR 6/8) sandy clay loam; weathered granite gneiss; massive; friable; few medium and thick clay flows into upper part; common fine flakes of mica; 10 percent fragments of weathered feldspar; 2 percent angular quartz pebbles 1/4 inch to 3 inches in diameter; very strongly acid.

The solum is 40 to more than 60 inches thick. Depth to the IIBt horizon is 20 to 40 inches. Depth to hard bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. The upper part of the subsoil is 0 to 15 percent rounded and subrounded quartz pebbles, and the lower part of the subsoil is 0 to 15 percent angular fragments of quartz and feldspar. In some places there is a stone line between the B2 and IIB2 horizons.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 through 8. Only a thin A1 horizon, however, has chroma of 2. The A horizon is fine sandy loam, sandy loam, or loam.

The B2 horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 4 through 8. The IIB2 horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 or 8. It commonly has high chroma mottles. The B horizon is clay loam or clay.

The C horizon is shades of red, brown, yellow, and white. It is sandy clay loam, loam, or sandy loam.

Suffolk series

The Suffolk series consists of deep, well drained soils that formed in fluviomarine sediment. Suffolk soils are on ridgetops of the Coastal Plain uplands. The slopes range from 2 to 7 percent.

Suffolk soils are commonly near Aquults, Dystrochrepts, and Udults and Goldsboro soils. Suffolk soils are better drained than Aquults and Goldsboro soils. In general, the thickness of the solum in Suffolk soils is more uniform and there is less variation in drainage than in Dystrochrepts and Udults.

Typical pedon of Suffolk sandy loam, 2 to 7 percent slopes, about 500 feet east of Route 608 and about 0.25 mile south of Massaponex River:

O1—1 inch to 0; partly decomposed pine needles and twigs.

Ap—0 to 10 inches; brown (7.5YR 5/4) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; 5 percent rounded quartz pebbles up to 1/2 inch in diameter; strongly acid; clear smooth boundary.

B1t—10 to 14 inches; strong brown (7.5YR 5/6) fine sandy loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few thin clay films on faces of peds; 1 percent rounded quartz pebbles up to 1/2 inch in diameter; very strongly acid; clear smooth boundary.

B2t—14 to 38 inches; strong brown (7.5YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few thin clay films on faces of peds; 1 percent rounded quartz pebbles up to 1/2 inch in diameter; very strongly acid; clear smooth boundary.

B3t—38 to 43 inches; strong brown (7.5YR 5/8) fine sandy loam; few fine faint yellowish red (5YR 5/6) mottles; weak fine subangular blocky structure; very friable, slightly sticky and slightly plastic; few fine roots; few thin clay films on faces of peds; 1 percent rounded quartz pebbles up to 1/2 inch in diameter; very strongly acid; clear smooth boundary.

C—43 to 60 inches; pale brown (10YR 6/3) loamy sand; few fine distinct strong brown (7.5YR 5/6) and brownish yellow (10YR 6/8) mottles; single grained; loose; 10 percent rounded quartz pebbles up to 1/2 inch in diameter; very strongly acid.

The solum is 30 to 50 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Rounded quartz pebbles up to 1 inch in diameter make up 0 to 5 percent of the solum and 0 to more than 20 percent of the C horizon.

The A horizon has hue of 7.5YR through 2.5Y, value of 3 through 6, and chroma of 1 through 4. Only a thin A1 horizon has value of 3 and chroma of 3 or less. The A horizon is fine sandy loam, sandy loam, or loamy sand. The B horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. It is sandy clay loam, clay loam, fine sandy loam, or sandy loam. The C horizon has hue of 7.5YR through 2.5Y, value of 5 through 7, and chroma of 2 through 8. It is loamy sand or sand.

Tatum series

The Tatum series consists of deep, well drained soils that formed in material that weathered from sericite schist. Tatum soils are on ridgetops and side slopes of the Piedmont uplands. The slopes commonly range from 2 to 25 percent.

Tatum soils are commonly near Abell, Brockroad, Catharpin, and Toddstav soils. Tatum soils are better drained than Abell and Toddstav soils. They have a thinner solum than Brockroad and Catharpin soils and a redder subsoil than Brockroad soils.

Typical pedon of Tatum loam, 2 to 7 percent slopes, about 75 feet south of Route 612 and about 2 miles west of Shady Grove:

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) loam; moderate fine granular structure; very friable; many fine and medium roots; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

A2—2 to 8 inches; brown (7.5YR 5/4) loam; moderate fine granular structure; very friable; many fine and medium roots; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; very strongly acid; clear smooth boundary.

B1t—8 to 12 inches; yellowish red (5YR 5/8) loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; few thin clay films on faces of peds; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; many very fine flakes of mica; very strongly acid; clear smooth boundary.

B2t—12 to 28 inches; red (2.5YR 5/8) clay; moderate fine subangular blocky structure; firm, slightly sticky and plastic; common fine roots; continuous thin clay films on faces of peds; 2 percent angular quartz pebbles 1/4 to 1 inch in diameter; many very fine flakes of mica; strongly acid; clear smooth boundary.

B3t—28 to 36 inches; red (2.5YR 5/8) clay loam; common fine and medium faint yellowish red (5YR 5/6) mottles; weak fine subangular blocky structure; friable; few thin and medium clay films on faces of peds; many very fine flakes of mica; 2 percent fragments of strongly weathered schist; strongly acid; gradual smooth boundary.

C1—36 to 44 inches; shades of red, yellow, purple, and white loam; massive; very friable; sericite schist saprolite; common thick clay flows in crevices; many very fine flakes of mica; strongly acid; gradual irregular boundary.

C2—44 to 77 inches; shades of red, yellow, pink, purple, and white silt loam; massive; very friable; sericite schist saprolite; strongly acid.

The solum is 25 to 50 inches thick. Depth to hard bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Angular quartz pebbles, 1/4 to 1 inch in diameter, make up 0 to 15 percent of the solum. Mica flakes are common throughout.

The A horizon has hue of 10YR or 7.5YR, value of 3 through 6, and chroma of 2 through 6. Only a thin A1 horizon has chroma of 3 or less. The A horizon is loam or silt loam.

The B2 horizon has hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 or 8. It is silty clay loam, silty clay, or clay. The B1 and B3 horizons have hue of 5YR through 10R, value of 4 or 5, and chroma of 6 or 8. They are silty clay loam, silty clay, clay, clay loam, or loam.

The C horizon is multicolored and is commonly strongly weathered sericite schist that crushes easily to loam or silt loam. In some places there is a Cr horizon.

Tetotum Variant

The Tetotum Variant consists of deep, moderately well drained soils that formed in alluvium and marine sediment. Tetotum Variant soils are on broad terraces that extend into the Piedmont province along the larger streams in Spotsylvania County. The slopes commonly range from 0 to 4 percent.

Tetotum Variant soils are commonly near Wickham soils and Aquults. They are not so well drained as Wickham soils and are better drained than Aquults.

Typical pedon of Tetotum Variant loam, about 300 yards north of the Po River and about 0.3 mile east of Route 612:

A1—0 to 2 inches; dark brown (10YR 3/3) loam; moderate fine granular structure; very friable; many fine roots; 3 percent rounded quartz pebbles 1/4 to

1/2 inch in diameter; few very fine flakes of mica; very strongly acid; clear smooth boundary.
A2—2 to 8 inches; light yellowish brown (2.5YR 6/4) loam; moderate fine granular structure; very friable; many fine roots; 3 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; few very fine flakes of mica; very strongly acid; clear smooth boundary.
B1t—8 to 11 inches; brownish yellow (10YR 6/6) silty clay loam; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few thin clay films on faces of peds; 3 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; few very fine flakes of mica; very strongly acid; clear smooth boundary.
B21t—11 to 26 inches; yellowish brown (10YR 5/6) clay loam; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; continuous thin clay films on faces of peds; common very fine flakes of mica; very strongly acid; clear smooth boundary.
B22t—26 to 42 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct light gray (10YR 6/1) mottles; moderate fine and medium subangular blocky structure; firm, slightly sticky and slightly plastic; many thin clay films on faces of peds; 5 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; common very fine flakes of mica; strongly acid; gradual smooth boundary.
B3tg—42 to 53 inches; gray (10YR 6/1) sandy loam; many fine and medium distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few thin clay films on faces of peds; common very fine flakes of mica; very strongly acid; clear smooth boundary.
C1g—53 to 59 inches; gray (10YR 6/1) sandy loam; many medium and coarse distinct yellowish brown (10YR 6/6) and strong brown (7.5YR 5/6) mottles; massive; very friable; 10 percent rounded quartz gravel 1/4 to 1/2 inch in diameter; common very fine flakes of mica; strongly acid; abrupt smooth boundary.
C2g—59 to 80 inches; gray (N 5/) loam; few medium prominent olive yellow (2.5Y 6/6) mottles; massive; friable; many very fine flakes of mica; strongly acid.

The solum is 40 to 60 or more inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Rounded quartz pebbles, up to 2 inches in diameter, make up 0 to 5 percent of the solum and 0 to 35 percent of the substratum. Flakes of mica are few to many throughout.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 through 4. It is silt loam or loam. The B horizon has hue of 10YR or 2.5Y and value of 4 through 6. It has chroma of 4 through 8 in the upper part and chroma of 1 through 8 in the lower part. It is silty clay loam, loam, sandy loam, or clay loam. The C horizon is gray or multicolored stratified material that ranges from sand to clay loam and their gravelly analogs.

Toccoa series

The Toccoa series consists of deep, well drained soils that formed in alluvium. Toccoa soils are in bottom positions on flood plains along streams in the Piedmont province. The slopes commonly range from 0 to 2 percent.

Toccoa soils are commonly near Aquults and Fluvaquents and Abell, Cartecay, and Wickham soils. Toccoa soils are better drained than Aquults and Fluvaquents and Abell and Cartecay soils. They have less clay than Wickham soils, and unlike Wickham soils, they do not have an argillic horizon.

Typical pedon of Toccoa loamy sand, about 100 feet south of the Rappahannock River, 0.5 mile north of Route 618 and about 3 miles east of Doswell Chapel:

Ap—0 to 9 inches; brown (7.5YR 4/4) loamy sand; weak fine granular structure; very friable; many fine roots; common fine flakes of mica; medium acid; clear smooth boundary.
C1—9 to 18 inches; dark yellowish brown (10YR 4/4) loamy sand; few medium distinct strong brown (7.5YR 5/6) mottles; massive; very friable; many fine roots; common fine flakes of mica; medium acid; clear smooth boundary.
C2—18 to 31 inches; brown (7.5YR 4/4) sandy loam; few fine faint pale brown (10YR 6/3) and strong brown (7.5YR 5/6) mottles; massive; very friable; common fine flakes of mica; common fine roots; medium acid; clear smooth boundary.
C3—31 to 36 inches; brown (7.5YR 4/4) sandy loam; massive; friable; few fine roots; common fine flakes of mica; common fine dark brown concretions; common root channels filled with pale brown (10YR 6/3) loamy sand; medium acid; clear smooth boundary.
C4—36 to 61 inches; strong brown (7.5YR 5/6) sandy loam; common fine faint pale brown (10YR 6/3) mottles; massive; friable; common fine flakes of mica; common fine and medium dark brown concretions; medium acid; clear smooth boundary.
C5—61 to 88 inches; strong brown (7.5YR 5/6) loam; few fine faint pale brown (10YR 6/3) mottles; massive; friable; few fine roots; 2 percent rounded granite and quartz pebbles 1/4 inch to 2 inches in diameter; common fine flakes of mica; common fine dark brown concretions and stains; strongly acid.

Depth to bedrock is more than 5 feet. Reaction ranges from strongly acid to slightly acid. Mica flakes range from few to many throughout the profile.

The A horizon has hue of 5YR through 10YR, value of 3 through 6, and chroma of 2 through 8. It is fine sandy loam, loam, or loamy sand. The C horizon has hue of 5YR through 10YR, value of 3 through 6, and chroma of 3 through 8. In some places there are gray mottles below a depth of 20 inches. The C horizon is sandy loam, loam, loamy sand, and sand. In some places the material below a depth of 40 inches is 20 to 40 percent gravel.

Toddstav series

The Toddstav series consists of deep, poorly drained soils that formed in alluvium and in the underlying material, which weathered from mica schist. Toddstav soils are along poorly defined drainageways in upland depressions and on toe slopes of the Piedmont province. The slopes commonly range from 0 to 4 percent.

Toddstav soils are commonly near and are more poorly drained than LaRoque, Margo, Nason, and Tatum soils.

Typical pedon of Toddstav silt loam, 0 to 4 percent slopes, 140 yards south of Porters at the junction of State Routes 612 and 606 and 500 yards east of State Route 612:

O1—1 inch to 0; partly decomposed leaves and twigs.
A1—0 to 3 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; friable; many fine and medium roots; extremely acid; clear smooth boundary.
A2—3 to 7 inches; gray (10YR 6/1) silt loam; few fine distinct brownish yellow (10YR 6/6) mottles; moderate fine granular structure; friable; many fine and medium roots; extremely acid; clear smooth boundary.
B1tg—7 to 13 inches; light gray (10YR 7/1) silt loam; common medium and fine distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; common thin clay films and silt coatings on faces of peds; common very fine flakes of mica; very strongly acid; clear smooth boundary.
B21tg—13 to 45 inches; gray (10YR 5/1) loam; many medium distinct brownish yellow (10YR 6/6) mottles; moderate fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; many thin clay films and silt coatings on faces of peds; common very fine flakes of mica; 1 percent angular quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.
B22tg—45 to 55 inches; light gray (10YR 7/2) silty clay loam; few medium distinct olive yellow (2.5Y 6/6) mottles; moderate coarse and medium prismatic structure; firm, slightly sticky and slightly plastic; few fine roots; continuous thin clay films and silt coatings on faces of peds; 2 percent angular quartz pebbles 1/4 inch to 1 1/2 inches in diameter; many very fine flakes of mica; very strongly acid; gradual smooth boundary.
IIB23tg—55 to 65 inches; light gray (10YR 7/2) loam; weak coarse subangular blocky structure; friable; common thin clay films on faces of peds; 1 percent angular quartz pebbles; 10 percent fragments of soft, highly weathered schist; many very fine flakes of mica; very strongly acid; gradual smooth boundary.
IIC—65 to 70 inches; gray (10YR 5/1) loam; massive; very friable; many very fine flakes of mica; very strongly acid.

The solum is 40 to more than 60 inches thick. Depth to bedrock is more than 5 feet. Angular and subrounded quartz pebbles, 1/4 inch to 2 inches in diameter, make up 0 to 10 percent of the solum. There are common to many fine and very fine mica flakes in the solum. Reaction is extremely acid to strongly acid unless lime has been added.

The A horizon is neutral and has value of 2 through 7, or it has hue of 10YR or 2.5Y, value of 2 through 7, and chroma of 1 or 2. Only the A1 horizon has value of 2 or 3. The A horizon is loam or silt loam.

The B horizon is neutral and has value of 4 through 7, or it has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 1 or 2. The upper part of the B horizon is loam, silt loam, clay loam, or silty clay loam, and the lower part is loam, fine sandy loam, silt loam, clay loam, or silty clay loam.

The color of the IIC horizon is variable and is commonly shades of gray and yellow. In some places, the C horizon does not have a dominant color. The C horizon is loam, silt loam, or sandy loam.

Turbeville series

The Turbeville series consists of deep, well drained soils that formed in alluvium in areas that are higher than the flood plains and in places are some distance from them. Turbeville soils are on ridgetops and side slopes of the Piedmont uplands. The slopes range from 2 to 15 percent.

Turbeville soils are commonly near Appling, Cecil, Masada, Nason, and Tatum soils. Turbeville soils have a thicker solum than Appling, Cecil, Nason, and Tatum soils, and they have a redder subsoil than Appling, Masada, and Nason soils.

Typical pedon of Turbeville loam, 2 to 7 percent slopes, about 0.25 mile north of Route 639, about 1,000 feet west of I-95:

Ap—0 to 12 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable; many fine roots; 2 percent rounded pebbles 1/4 to 1/2 inch in diameter; slightly acid; clear smooth boundary.

B1t—12 to 16 inches; red (2.5YR 4/6) clay loam; moderate fine subangular blocky structure; friable, sticky and slightly plastic; many fine roots; few thin clay films on faces of peds; 1 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; neutral; clear smooth boundary.

B21t—16 to 34 inches; red (2.5YR 4/6) clay loam; moderate fine and medium subangular blocky structure; firm, sticky and plastic; common fine roots; common thin clay films on faces of peds; 1 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; few fine dark brown concretions; slightly acid; clear smooth boundary.

B22t—34 to 58 inches; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; firm, sticky and plastic; many thin clay films on faces of peds; few fine flakes of mica; 1 percent quartz pebbles 1/4 to 1/2 inch in diameter; common concretions; strongly acid; clear smooth boundary.

B23t—58 to 65 inches; red (2.5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, very sticky and plastic; many thin and medium clay films on faces of peds; dark red (10YR 3/6) coatings on faces of peds; few fine flakes of mica; 2 percent quartz pebbles 1/4 to 1/2 inch in diameter; strongly acid.

The solum is more than 60 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Quartz, granite, gneiss, and greenstone pebbles, 1/4 inch to 3 inches in diameter, make up 0 to 15 percent of the solum. In some places this soil is underlain by weathered bedrock.

The A horizon has hue of 5YR through 10YR, value of 3 through 6, and chroma of 1 through 6. Only a thin A1 horizon has chroma of 3 or less. The A horizon is loam, silt loam, or sandy loam.

The B1 horizon has hue of 10YR through 2.5YR, value of 4 or 5, and chroma of 4 or 6. It is loam, sandy loam, or clay loam. The B2t horizon has hue of 5YR through 10R, value of 3 or 4, and chroma of 4 through 8. In some places there are high chroma mottles in the lower part of the B2t horizon. Mica flakes are few or common in the lower part of the B2t horizon. The texture is clay, clay loam, or sandy clay.

In some places there is a C horizon. It commonly is stratified sandy clay or sandy clay loam. In some places it is underlain by strongly weathered granite, granite gneiss, or schist.

Udifluvents

Udifluvents in Spotsylvania County consist of deep, well drained and moderately well drained soils that formed in sandy, loamy, and clayey alluvium. They are on flood plains along streams and large drainageways of the Piedmont region and Coastal Plain. The slopes range from 0 to 2 percent. Udifluvents are mapped only in a complex with Fluvaquents and in a complex with Udorthents.

Udifluvents are commonly near Altavista, Margo, and Toddstav soils, and unlike these soils, Udifluvents do not have an argillic horizon.

Because of the variability of Udifluvents, a typical pedon is not described. The alluvium generally is more than 5 feet thick. Reaction ranges from strongly acid to extremely acid. Rounded quartz pebbles, 1/4 inch to 2 inches in diameter, make up 0 to 15 percent of the upper 30 inches of the solum; they make up 50 percent or more of the individual layers. The content of these pebbles in the deeper layers is commonly high.

The surface layer of these soils is less than 16 inches thick. The A horizon has hue of 7.5YR through 2.5Y, value of 4 through 7, and chroma of 3 through 8. It ranges from loamy sand to clay loam and their gravelly or very gravelly analogs.

The substratum above a depth of 30 inches has hue of 7.5YR through 2.5Y, value of 4 through 7, and chroma of 3 through 8. Below a depth of 30 inches it is neutral and has value of 4 through 7, or it has hue of 7.5YR through 2.5Y, value of 4 through 7, and chroma of 1 through 8. It is made up of stratified alluvium that ranges from sandy to clayey.

Udorthents

Udorthents in Spotsylvania County consist of deep, somewhat excessively drained to moderately well drained soils along drainageways and disturbed soils that are mostly in and around areas used for mining sand and gravel. These soils are mostly on the Coastal Plain. They formed in sandy and loamy sediment of fluviomarine origin. The slopes commonly range from 2 to about 25 percent, but in some areas they are more than 60 percent.

Udorthents are commonly near Altavista, Emporia, Savannah, and Wickham soils, and unlike these soils, Udorthents do not have an argillic horizon.

Because of the variability of Udorthents, a typical pedon is not described. The soils commonly are 10 to more than 60 inches thick and are strongly acid to extremely acid throughout. Rounded quartz pebbles and cobblestones make up 10 to more than 60 percent of the soil material.

The A horizon has hue of 7.5YR through 2.5Y, value of 4 through 7, and chroma of 2 through 8. It is sandy clay loam to sand and their gravelly and very gravelly analogs. The A horizon is commonly 4 to 12 inches thick, but it ranges in thickness from 2 to 20 inches.

The substratum has hue of 7.5YR through 2.5Y, value of 5 through 8, and chroma of 1 through 8. The fine earth fraction is sand or loamy sand and has thin layers of sandy loam. In some places the substratum is sandy loam throughout.

Udults

Udults in Spotsylvania County consist of deep, well drained and moderately well drained soils that formed in sandy, loamy, and clayey sediment of fluviomarine origin. Udults are on ridges and side slopes of the Coastal Plain and on terrace breaks along large streams. The slopes range from 7 to more than 50 percent. Udults are mapped only in a complex with Dystrochrepts and in a complex with Urban Land.

Udults are near Faceville, Kempsville, and Savannah soils, and unlike these soils, Udults do not have a uniform, well developed subsoil.

Because of the variability of Udults, a typical pedon is not described. The solum ranges in thickness from 10 to 60 inches or more. Depth to bedrock is more than 5 feet. Rounded quartz pebbles, up to 3 inches in diameter, make up 0 to more than 50 percent of the solum and substratum. These soils are extremely acid to strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 through 4. It is commonly sandy loam and ranges from very gravelly sandy loam to clay. The A horizon is 6 to 16 inches thick.

The Bt horizon has hue of 2.5YR through 2.5Y, value of 4 through 7, and chroma of 2 through 8. It is sandy loam to clay and their gravelly and very gravelly analogs. The Bt horizon ranges in thickness from 4 to more than 70 inches.

The C horizon has hue of 2.5YR through 2.5Y, or it is neutral; it has value of 4 through 7 and chroma of 0 through 8. It ranges from sand to clay and their gravelly and very gravelly analogs.

Varina series

The Varina series consists of deep, well drained soils that formed in fluviomarine sediment. Varina soils are on ridgetops and side slopes of the Coastal Plain uplands. The slopes range from 2 to 15 percent. Varina soils are mapped only in a complex with Faceville soils.

Varina soils are commonly near Emporia, Faceville, and Savannah soils. Varina soils have more clay than Emporia soils and are not so red as Faceville soils. Unlike Savannah soils, Varina soils do not have a fragipan.

Typical pedon of Varina sandy loam, in an area of Faceville-Varina complex, 2 to 7 percent slopes, on the west side of Route 1 about 1 mile south of Massaponax:

Ap—0 to 9 inches; light yellowish brown (10YR 6/4) sandy loam; moderate fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

B1t—9 to 13 inches; yellowish brown (10YR 5/6) sandy loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; thin coating and bridging of sand grains; strongly acid; clear smooth boundary.

B21t—13 to 20 inches; strong brown (7.5YR 5/6) clay loam; few fine faint pale brown (10YR 6/3) mottles; moderate fine subangular blocky structure; firm, sticky and slightly plastic; few fine roots; few thin clay films on faces of peds; few medium reddish yellow iron concretions; strongly acid; clear smooth boundary.

B22t—20 to 31 inches; strong brown (7.5YR 5/6) clay; common fine faint pale brown (10YR 6/3) and red (2.5YR 4/6) mottles; moderate fine subangular blocky structure; firm, sticky and slightly plastic; common medium reddish yellow iron concretions; common thin clay films on faces of peds; 1 percent quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.

B23t—31 to 42 inches; yellowish brown (10YR 5/6) clay; many medium and coarse prominent red (2.5YR 4/8), brownish yellow (10YR 6/6), and light gray (10YR 7/1) mottles; weak very thick platy structure parting to moderate fine and medium subangular blocky; very firm, sticky and plastic; few fine pores; common thin and medium clay films on faces of peds; 10 percent nodules of plinthite; 2 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.

B24t—42 to 54 inches; brownish yellow (10YR 6/8), red (10R 4/6), light olive gray (5Y 6/2), and light gray (10YR 7/1) sandy clay; moderate thin and medium platy structure; very firm, sticky and plastic; few fine pores; common thin and medium clay films on horizontal faces of peds; 10 percent nodules of plinthite; 1 percent rounded quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; clear smooth boundary.

B25t—54 to 89 inches; red (10R 4/6), brownish yellow (10YR 6/8), and gray (10YR 6/1) clay loam; strong thin platy structure; very firm, sticky and plastic; few fine pores; common thin and medium clay films on horizontal faces of peds; 10 percent nodules of plinthite; 4 percent rounded quartz pebbles 1/4 inch to 1 1/2 inches in diameter; very strongly acid.

The solum is 60 to more than 120 inches thick. Depth to a horizon that is more than 5 percent plinthite is 30 to 50 inches. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Rounded quartz pebbles, 1/4 inch to 2 inches in diameter, make up 0 to 5 percent of the upper part of the solum and 0 to more than 30 percent of the lower part of the B horizon.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 1 through 4. It is sandy loam, fine sandy loam, or loam.

The B1t horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 8. It is loam, sandy loam, or sandy clay loam.

The upper part of the B2t horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 4 through 8. The lower part of the B2t horizon is variegated and has hue of 10R through 2.5Y, value of 4 through 7, and chroma of 1 through 8. The B2t horizon is clay or clay loam and has subhorizons that are sandy clay. Plinthite makes up 10 to 25 percent of the lower part of the B2t horizon.

In some places there is a C horizon. It has the same color pattern as the lower part of the Bt horizon and ranges from sandy loam to sandy clay. Rounded quartz pebbles make up 0 to 30 percent. The C horizon commonly is stratified Coastal Plain sediment, and in some places it is material that weathered from Piedmont rocks.

Watt series

The Watt series consists of moderately deep, somewhat excessively drained soils that formed in material that weathered from graphitic schist. Watt soils are on side slopes of the Piedmont uplands. The slopes commonly range from 15 to 35 percent.

Watt soils are commonly near Brockroad, Catharpin, LaRoque, Nason, and Tatum soils, all of which are well drained. Watt soils have a grayer solum and less clay than Brockroad, Catharpin, Nason, and Tatum soils.

Typical pedon of Watt channery silt loam, 15 to 35 percent slopes, about 200 yards south of Brockroad Crossing on the west side of Route 613:

O1—1 inch to 0; leaves and twigs.

A1—0 to 1 inch; very dark gray (10YR 3/1) channery silt loam; moderate very fine granular structure; very friable; many fine and medium roots; 20 percent thin fragments of weathered schist and quartz; extremely acid; clear smooth boundary.

A2—1 inch to 7 inches; dark gray (N 4/) channery silt loam; moderate fine granular structure; friable; many fine and medium roots; 20 percent thin fragments of weathered schist and quartz; extremely acid; clear smooth boundary.

B—7 to 16 inches; very dark gray (N 3/) channery silt loam; moderate medium subangular blocky structure; friable; many fine and medium roots; 25 percent thin fragments of weathered schist; extremely acid; gradual smooth boundary.

C—16 to 32 inches; very dark gray (N 3/) channery silt loam; few medium and coarse distinct yellowish brown (10YR 5/6) mottles; massive; very friable; common fine and medium roots; 45 percent coarse fragments of weathered schist; very strongly acid; clear wavy boundary.

R—32 inches; black (10YR 2/1) partly weathered graphitic schist.

The solum is 10 to 24 inches thick. Depth to bedrock ranges from 20 to 40 inches. Reaction is extremely acid or very strongly acid unless lime has been added. Angular quartz pebbles make up 0 to 5 percent of the solum. Fragments of weathered schist make up 5 to 35 percent of the A and B horizons and 15 to about 50 percent of the C horizon.

The A horizon is neutral and has value of 2 through 5, or it has hue of 7.5YR through 2.5Y, value of 2 through 5, and chroma of 1 or 2. It is silt loam or loam in the fine earth fraction.

The B horizon is neutral and has value of 2 through 5, or it has hue of 7.5YR through 2.5Y, value of 2 through 5, and chroma of 1 or 2. It is silt loam or silty clay loam in the fine earth fraction.

The C horizon is strongly weathered graphitic schist. It is neutral and has value of 3 or 4, or it has hue of 7.5YR through 10YR, value of 3 or 4, and chroma of 1 or 2. It is channery or very channery loam or silt loam. In places the C horizon grades to a Cr horizon that is soft to a depth of 10 feet or more.

Wedowee series

The Wedowee series consists of deep, well drained soils that formed in material that weathered from granite and granite gneiss.

Wedowee soils are on ridgetops, on points of ridges, and near slope breaks on side slopes of the Piedmont uplands. The slopes range from 7 to 25 percent. Wedowee soils are mapped only in a complex with Appling soils.

Wedowee soils are commonly near Appling, Louisburg, Partlow, and Spotsylvania soils. They have a thicker solum than Appling and Louisburg soils, and they are better drained than Partlow soils. Unlike Spotsylvania soils, Wedowee soils do not have a IIB horizon.

Typical pedon of Wedowee sandy loam, in an area of Appling-Wedowee sandy loams, 7 to 15 percent slopes, eroded, 0.5 mile east of Goshin Church, 0.5 mile north of Military Park Road and about 50 feet south of Cedar Run Subdivision Road:

O1—1 inch to 0; partly decomposed pine needles.

Ap—0 to 6 inches; brownish yellow (10YR 6/6) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; 2 percent angular quartz pebbles 1/4 to 1 inch in diameter; very strongly acid; abrupt smooth boundary.

B1t—6 to 10 inches; strong brown (7.5YR 5/6) sandy clay; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; few thin clay films on faces of peds; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; few fine flakes of mica; very strongly acid; clear smooth boundary.

B2t—10 to 22 inches; yellowish red (5YR 5/8) clay; few fine faint strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; continuous medium clay films on faces of peds; 1 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; common fine flakes of mica; very strongly acid; clear smooth boundary.

B3t—22 to 33 inches; strong brown (7.5YR 5/6) clay; many medium faint brownish yellow (10YR 6/8) mottles; weak fine and medium subangular blocky structure; friable, slightly plastic; few fine roots; common thin clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual smooth boundary.

C—33 to 75 inches; brownish yellow (10YR 6/8), strong brown (7.5YR 5/6), yellowish red (5YR 5/8), and white (10YR 8/1) clay loam; massive; friable; few medium and thick clay flows in the upper 10 inches; 2 percent angular quartz pebbles 1/4 inch to 2 inches in diameter; common fine flakes of mica; strongly acid.

The solum is 20 to 40 inches thick. Depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid unless lime has been added. Angular quartz pebbles, 1/4 inch to 2 inches in diameter, make up 0 to 8 percent of the solum. Fine mica flakes are few to common in the B and C horizons.

The A horizon has hue of 7.5YR through 2.5Y, value of 3 through 7, and chroma of 3 through 6. It is sandy loam, sandy clay loam, or loam. The B horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 6 or 8. The B horizon is sandy clay loam, sandy clay, clay loam, loam, or clay. The C horizon is strongly weathered granite or granite gneiss that crushes easily to sandy loam, loam, or clay loam.

Wickham series

The Wickham series consists of deep, well drained soils that formed in alluvium. Wickham soils are on terraces along the larger streams in Spotsylvania County. The slopes range from 0 to 7 percent.

Wickham soils are commonly near and are better drained than Aquults and Altavista soils.

Typical pedon of Wickham loam, 2 to 7 percent slopes, on the east side of Route 733 and about 0.5 mile north of Route 17:

Ap—0 to 10 inches; brown (7.5YR 4/4) loam; moderate fine granular structure; very friable; many fine roots; medium acid; clear smooth boundary.

B1—10 to 14 inches; strong brown (7.5YR 5/6) loam; moderate fine subangular blocky structure; very friable; many fine roots; 2 percent rounded quartz pebbles 1/4 to 1/2 inch in diameter; medium acid; clear smooth boundary.

B2t—14 to 37 inches; yellowish red (5YR 5/6) loam; moderate fine subangular blocky structure; friable, sticky and slightly plastic; many fine roots; few thin clay films on faces of peds; few fine black concretions; common fine flakes of mica; 2 percent fine rounded quartz pebbles 1/4 to 1/2 inch in diameter; medium acid; gradual smooth boundary.

B3t—37 to 46 inches; strong brown (7.5YR 5/8) loam; common medium faint yellowish red (5YR 4/8) mottles; weak fine subangular blocky structure; friable, sticky and slightly plastic; few fine roots; few thin clay films on faces of peds; common fine flakes of mica; 10 percent rounded quartz pebbles 1/4 to 1 inch in diameter; strongly acid; gradual smooth boundary.

C—46 to 67 inches; strong brown (7.5YR 5/8) gravelly loam; many fine distinct yellowish red (5YR 4/8) and pale brown (10YR 6/3) mottles; massive; very friable; 12 percent rounded quartz pebbles 1/4 inch to 2 inches in diameter; common mica flakes; strongly acid.

The solum is 36 to more than 60 inches thick. Depth to bedrock is more than 5 feet. Reaction ranges from very strongly acid to medium acid unless lime has been added. Rounded quartz pebbles, 1/4 inch to 3 inches in diameter, make up 0 to 10 percent of the solum and up to 50 percent of the substratum. Mica flakes are few to common in the B2 and C horizons.

The A horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 3 through 6. In some places there is an A1 horizon, which commonly has chroma of less than 3. The A horizon is loam, sandy loam, fine sandy loam, or loamy sand.

The B1 horizon has hue of 5YR or 7.5YR, value of 4 through 6, and chroma of 3 through 8. It is loam, sandy loam, sandy clay loam, or clay loam. The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 through 8. It is loam, sandy clay loam, or clay loam. There are thin lenses of clay or sandy clay in some places. The B3 horizon has hue of 2.5YR through 7.5YR, value of 4 or 5, and chroma of 4 through 8. The B3 horizon is loam, sandy loam, sandy clay loam, or clay loam.

The C horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 3 through 8. It ranges from sandy clay loam to sand in the fine earth fraction. In some places the soil is underlain by material that weathered from bedrock.

Formation of the Soils

This section discusses the major factors of soil formation and their importance in the formation of the soils in Spotyslvania County. It also discusses the processes of soil formation that have affected the development of soils in the county.

Factors of Soil Formation

Soil is a natural, three-dimensional body capable of supporting plant growth. The characteristics of a soil are determined by the interaction of the five major soil forming factors. These factors are climate, living organisms, parent material, relief, and time. Theoretically, if all these factors are identical at different sites, the soils at these sites will also be identical. Variations between soils are caused by variations in one or more of these factors.

Climate

Climate regulates the rate of weathering and decomposition of minerals. It also influences the rate that materials are removed from the soil by leaching. Because of their influence on the biotic community, factors such as precipitation, temperature, and the evapotranspiration ratio also help determine soil characteristics.

The climate in Spotsylvania County is humid, temperate, and continental. It is fairly uniform throughout the county, and soil differences within the county are mainly the result of differences in vegetation, parent material, relief, drainage, and the age of the soil material.

Living Organisms

The vegetation growing on a soil influences the color, structure, and organic matter content of the soil. Soils that formed under forest vegetation are generally lighter in color than those that formed under grass because grass returns more organic matter to the soil. Most of the soils in Spotsylvania County formed under hardwood forests.

Bacteria, fungi, and many other micro-organisms aid in the breakdown and return of plant residue to the soil. Generally, fungi are most active in the breakdown under acid conditions, and bacteria are most active under neutral or alkaline conditions.

Animals have a very active role in soil formation. Earthworms, burrowing insects, and other small animals constantly mix the soil. Their burrows help make the soil porous and facilitate percolation. Earthworms help incorporate organic matter into the soil. Leaf litter that contains a lot of earthworms is usually incorporated into the soil by the early part of the following spring. If the earthworm population is low, leaf litter may remain on the surface for 2 or 3 years.

Parent Material

Parent material is the unconsolidated mineral material in which a soil forms. The nature of the parent material determines the mineral and chemical composition of the soil and, to a large extent, the rate at which a soil forms. In Spotsylvania County the soils formed in residuum, Coastal Plain sediment, or recent alluvium.

Many soils in the Piedmont region formed in residuum of granite gneiss, granite, hornblende gneiss, and mixed metamorphic rock. Soils that formed in residuum generally are strongly acid or very strongly acid, have a clayey subsoil, and, if they are well drained, are yellowish brown to red in the subsoil. Appling, Cecil, Pacolet, and Wedowee soils are examples. Soils that formed in residuum of hornblende gneiss, however, have a more plastic and less acid subsoil. Fluvanna and Orange soils are examples.

Soils that formed in Coastal Plain sediment are generally loamy or medium textured, and some are clayey. Norfolk and Suffolk soils are examples of loamy soils.

Soils on flood plains formed in water-laid material, called recent alluvium. These soils are sandy or loamy and have little or no horizonal development. Cartecay and Toccoa soils are examples.

Relief

Relief is an important factor in soil formation. Different types of soils can develop in the same kind of parent material because of differences in relief. Relief is often an important factor in differentiating soil series. Some soil characteristics, such as mottling, are directly related to slope and internal drainage. Poindexter, Fluvanna, and Orange soils, for example, all formed in about the same material.

Relief also affects erosion, the air and soil temperature, and the plant cover. It influences depth to

the water table, internal drainage, accumulation and removal of organic matter, and other phenomena.

Relief affects the amount of water that is absorbed by the soil. From an equivalent amount of rainfall, sloping soils will absorb less water, and soils in depressions will absorb more water than flat or nearly level soils will. The nearly level soils generally are the most well developed because they are neither saturated nor droughty. The formation of soils on steep slopes tends to be impeded by erosion and by the small amount of water the soil can absorb.

Time

The length of time that the parent material is exposed to the other factors of soil formation is important. Generally, the horizons become more distinct with time, as living organisms and climate act upon the parent material. The distinctness of the horizons indicates the relative maturity of a soil.

Most of the soils in Spotsylvania County have been forming for millions of years. On steep soils, geologic erosion keeps pace with soil formation; thus the soil horizons are thin, and depth to parent material, in places, is only a few inches. In areas where the soils are rolling or flat, the horizons are much thicker, and depth to parent material generally is more than 40 inches.

Soils that formed in recent alluvium, such as Cartecay and Toccoa soils, have no distinct horizons because the other factors of soil formation have not had enough time to significantly affect them. These soils are the youngest in the county.

Processes of Soil Formation

Soils are formed through complex, interrelated, continuous processes. These processes fall into four general categories: addition, removal, transfer, and transformation. These processes occur in the formation of all soils although their relative importance varies.

The accumulation of organic matter in the soil is a form of the addition process that occurs in Spotsylvania County. The amount of organic matter that is added to the soil almost entirely determines the color of the surface layer. In places where the parent material is recent alluvium, the color is relatively uniform throughout the profile.

In many of the soils in Spotsylvania County, lime and other nutrients have been leached from the upper 2 to 4 feet of the soil. This is an example of the removal process.

In Spotsylvania County, water is the carrier most often involved in the transfer process. Soluble bases are released during the decomposition of mineral material and are leached downward. In many of the soils, clay and sesquioxides are transferred from the A horizon to the B horizon. Thus the Bt horizon, especially the B2t horizon, is a zone of illuviation, or gain. In many soils the B horizon contains more clay than the original parent material, and the A horizon contains less. In the B horizon of some soils, there are thin films of clay in the pores and on the faces of peds. The presence or lack of these films is an important criterion in soil classification. In Appling and Tatum soils, for example, there is evidence that clay has been transferred from the A horizon to the B horizon.

Transformation of mineral compounds occurs in most soils. Transformation is most apparent if the soil has not been subjected to rapid erosion, and organic material has not accumulated on the surface. The primary silicate minerals are weathered chemically to produce secondary minerals, mainly layer-lattice silicate clays.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the

activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, alluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface,

have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stockpiling plant growth. Allowing fall plant growth (usually tall fescue) to accumulate for use as winter pasture.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1952-76 at Partlow, Virginia]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	46.5	20.8	33.6	72	-10	43	3.02	1.79	4.11	8	6.4
February---	49.6	23.8	36.6	75	-1	61	3.58	1.78	5.13	8	4.3
March------	58.7	31.5	45.2	83	10	225	4.10	2.33	5.67	8	3.0
April------	70.7	41.0	56.0	91	20	480	3.22	1.93	4.36	7	.2
May--------	78.1	49.4	63.8	95	27	738	4.20	2.01	6.08	9	.0
June-------	85.1	58.1	71.7	98	38	951	3.83	2.36	5.15	7	.0
July-------	89.0	62.4	75.8	100	45	1,110	4.29	1.76	6.42	7	.0
August-----	87.4	61.7	74.6	99	43	1,073	5.08	2.49	7.32	8	.0
September--	81.2	53.4	67.4	97	31	822	3.96	1.34	6.11	5	.0
October----	71.0	41.0	56.0	89	18	496	3.83	1.32	5.89	5	.0
November---	60.2	31.2	45.7	81	8	188	3.11	1.50	4.49	6	.8
December---	49.4	24.2	36.8	74	-4	135	3.30	1.40	4.91	6	2.9
Yearly:											
Average--	68.9	41.5	55.3	---	---	---	---	---	---	---	---
Extreme--	---	---	---	102	-10	---	---	---	---	---	---
Total----	---	---	---	---	---	6,322	45.52	35.56	55.30	84	17.6

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1952-76 at Partlow, Virginia]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 24	May 9	May 17
2 years in 10 later than--	April 19	May 3	May 12
5 years in 10 later than--	April 9	April 22	May 4
First freezing temperature in fall:			
1 year in 10 earlier than--	October 10	October 2	September 23
2 years in 10 earlier than--	October 15	October 6	September 28
5 years in 10 earlier than--	October 25	October 16	October 7

TABLE 3.--GROWING SEASON

[Recorded in the period 1952-76 at Partlow, Virginia]

Probability	Length of growing season if daily minimum temperature is--		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	175	150	134
8 years in 10	183	159	141
5 years in 10	199	176	155
2 years in 10	214	192	169
1 year in 10	222	201	177

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1B	Abell sandy loam, 2 to 7 percent slopes	7,915	3.0
2B	Altavista sandy loam, 0 to 4 percent slopes	1,610	0.6
3B	Appling sandy loam, 2 to 7 percent slopes	9,600	3.6
4C2	Appling-Wedowee sandy loams, 7 to 15 percent slopes, eroded	39,060	14.8
4D2	Appling-Wedowee sandy loams, 15 to 25 percent slopes, eroded	7,490	2.8
5	Aquults, clayey subsoil	2,205	0.8
6	Aquults, gravelly substratum	3,200	1.2
7B	Aquults, loamy-Margo complex, 2 to 7 percent slopes	4,315	1.6
8B	Bama sandy loam, 2 to 7 percent slopes	680	0.3
8C	Bama sandy loam, 7 to 15 percent slopes	366	0.1
9B	Brockroad silt loam, 2 to 7 percent slopes	6,360	2.4
10	Cartecay sandy loam	1,015	0.4
11B	Catharpin silt loam, 2 to 7 percent slopes	7,650	2.9
12B	Cecil loam, 2 to 7 percent slopes	3,946	1.5
13C2	Cecil-Pacolet complex, 7 to 15 percent slopes, eroded	5,030	1.9
13D2	Cecil-Pacolet complex, 15 to 25 percent slopes, eroded	345	0.1
14B	Colfax sandy loam, 2 to 7 percent slopes	3,410	1.3
14C	Colfax sandy loam, 7 to 15 percent slopes	1,800	0.7
15B2	Cullen loam, 2 to 7 percent slopes, eroded	265	0.1
15C2	Cullen loam, 7 to 15 percent slopes, eroded	2,200	0.8
15D2	Cullen loam, 15 to 25 percent slopes, eroded	555	0.2
16	Dogue loam	850	0.3
17C	Dystrochrepts-Udults complex, sloping	660	0.3
17D	Dystrochrepts-Udults complex, moderately steep	2,700	1.0
17E	Dystrochrepts-Udults complex, steep	3,500	1.3
18B	Emporia sandy loam, 2 to 7 percent slopes	4,385	1.7
18C	Emporia sandy loam, 7 to 15 percent slopes	600	0.2
19B	Faceville loam, 2 to 7 percent slopes	430	0.2
20B	Faceville-Marlboro complex, 2 to 7 percent slopes	2,330	0.9
20C2	Faceville-Marlboro complex, 7 to 15 percent slopes, eroded	450	0.2
21B	Faceville-Varina complex, 2 to 7 percent slopes	4,510	1.7
21C2	Faceville-Varina complex, 7 to 15 percent slopes, eroded	2,230	0.8
22B	Fluvanna fine sandy loam, 2 to 7 percent slopes	2,255	0.9
22C2	Fluvanna fine sandy loam, 7 to 15 percent slopes, eroded	6,820	2.6
22D2	Fluvanna fine sandy loam, 15 to 25 percent slopes, eroded	500	0.2
23	Fluvaquents-Udifluvents complex	11,280	4.3
24	Goldsboro sandy loam	1,535	0.6
25B	Kempsville gravelly sandy loam, 2 to 7 percent slopes	395	0.2
25C	Kempsville gravelly sandy loam, 7 to 15 percent slopes	3,025	1.2
25D	Kempsville gravelly sandy loam, 15 to 25 percent slopes	355	0.1
26C	LaRoque loam, 7 to 15 percent slopes	230	0.1
26D	LaRoque loam, 15 to 25 percent slopes	1,540	0.6
26E	LaRoque loam, 25 to 55 percent slopes	1,930	0.7
27C	Louisburg sandy loam, 7 to 15 percent slopes	980	0.4
27D	Louisburg sandy loam, 15 to 25 percent slopes	4,750	1.8
27E	Louisburg sandy loam, 25 to 50 percent slopes	3,685	1.4
28B	Margo loam, 2 to 7 percent slopes	4,045	1.5
29B	Masada loam, 2 to 7 percent slopes	660	0.3
29C2	Masada loam, 7 to 15 percent slopes, eroded	325	0.1
30B	Mattaponi sandy loam, 2 to 7 percent slopes	630	0.2
31C2	Mattaponi sandy clay loam, 7 to 15 percent slopes, eroded	1,450	0.6
32B	Nason silt loam, 2 to 7 percent slopes	2,932	1.1
32C2	Nason silt loam, 7 to 15 percent slopes, eroded	12,940	4.9
32D2	Nason silt loam, 15 to 25 percent slopes, eroded	3,712	1.4
33B	Orange-Iredell loams, 2 to 7 percent slopes	1,970	0.7
33C2	Orange-Iredell loams, 7 to 15 percent slopes, eroded	1,457	0.6
34B	Partlow sandy loam, 0 to 7 percent slopes	10,290	3.9
35C	Poindexter loam, 7 to 15 percent slopes	515	0.2
35D	Poindexter loam, 15 to 25 percent slopes	1,560	0.6
35E	Poindexter loam, 25 to 60 percent slopes	400	0.2
36A	Savannah sandy loam, 0 to 2 percent slopes	1,110	0.4
36B	Savannah sandy loam, 2 to 7 percent slopes	7,235	2.8
37B	Spotsylvania fine sandy loam, 2 to 7 percent slopes	3,150	1.2
37C	Spotsylvania fine sandy loam, 7 to 15 percent slopes	765	0.3
38B	Suffolk sandy loam, 2 to 7 percent slopes	227	0.1
39B	Tatum loam, 2 to 7 percent slopes	4,625	1.8
39C2	Tatum loam, 7 to 15 percent slopes, eroded	7,475	2.8
39D2	Tatum loam, 15 to 25 percent slopes, eroded	370	0.1
40	Tetotum Variant loam	1,035	0.4
41	Toccoa loamy sand	240	0.1
42B	Toddstav silt loam, 0 to 4 percent slopes	7,405	2.8
43B	Turbeville loam, 2 to 7 percent slopes	340	0.1

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
43C2	Turbeville loam, 7 to 15 percent slopes, eroded	330	0.1
44	Udorthents, gravelly	450	0.2
45B	Udorthents-Udifluvents complex, gently sloping	4,350	1.7
46	Urban land-Udults complex, smoothed	1,760	0.7
47E	Watt channery silt loam, 15 to 35 percent slopes	210	0.1
48A	Wickham loam, 0 to 2 percent slopes	910	0.3
48B	Wickham loam, 2 to 7 percent slopes	1,925	0.7
	Water	5,300	2.0
	Total	263,040	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Corn silage	Soybeans	Wheat	Oats	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Bu	Ton	AUM*
1B---------- Abell	120	24	35	55	60	3.5	7.5
2B---------- Altavista	110	22	40	55	60	4.0	8.5
3B---------- Appling	110	22	35	45	55	4.8	9.0
4C2---------- Appling-Wedowee	90	18	30	40	50	4.0	8.0
4D2---------- Appling-Wedowee	75	15	20	30	40	3.5	7.5
5**, 6**. Aquults							
7B---------- Aquults-Margo	110	22	35	---	---	3.0	7.0
8B---------- Bama	115	23	35	35	50	4.0	8.0
8C---------- Bama	95	19	25	25	40	3.0	7.5
9B---------- Brockroad	120	24	40	65	70	4.0	9.0
10---------- Cartecay	85	17	40	25	45	3.5	7.0
11B---------- Catharpin	120	24	40	60	75	3.5	7.5
12B---------- Cecil	105	21	35	50	70	4.5	8.5
13C2---------- Cecil-Pacolet	90	18	30	40	50	4.0	8.0
13D2---------- Cecil-Pacolet	75	15	25	30	40	3.5	7.0
14B---------- Colfax	85	16	30	45	65	2.4	6.0
14C---------- Colfax	70	14	25	40	60	2.4	6.0
15B2---------- Cullen	130	26	45	60	80	3.8	9.0
15C2---------- Cullen	115	23	40	50	70	3.6	8.0
15D2---------- Cullen	90	18	30	40	55	3.0	7.0
16---------- Dogue	125	25	45	60	80	3.5	9.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Soybeans	Wheat	Oats	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Bu	Ton	AUM*
17C---------- Dystrochrepts-Udults	---	---	---	---	---	---	---
17D---------- Dystrochrepts-Udults	---	---	---	---	---	---	---
17E---------- Dystrochrepts-Udults	---	---	---	---	---	---	---
18B---------- Emporia	100	20	30	50	70	5.0	8.0
18C---------- Emporia	90	18	25	45	60	5.0	8.0
19B---------- Faceville	115	23	45	50	70	5.0	8.5
20B---------- Faceville-Marlboro	110	22	43	50	70	5.5	8.5
20C2---------- Faceville-Marlboro	80	16	25	40	60	5.5	8.5
21B---------- Faceville-Varina	105	21	43	50	70	5.5	8.5
21C2---------- Faceville-Varina	80	16	29	40	60	5.5	8.5
22B---------- Fluvanna	120	24	35	50	65	3.0	8.0
22C2---------- Fluvanna	100	20	30	40	50	3.0	8.0
22D2---------- Fluvanna	80	16	25	25	40	2.5	6.0
23---------- Fluvaquents-Udifluvents	---	---	---	---	---	---	---
24---------- Goldsboro	125	25	45	50	70	5.0	8.5
25B---------- Kempsville	110	20	30	40	55	3.0	6.5
25C---------- Kempsville	90	18	24	30	50	2.5	6.0
25D---------- Kempsville	75	15	20	25	40	2.0	5.5
26C---------- LaRoque	50	5	25	25	4.5	2.0	3
26D---------- LaRoque	---	---	---	---	---	2.0	3
26E---------- LaRoque	---	---	---	---	---	---	---
27C---------- Louisburg	45	5	25	25	45	2.0	3
27D---------- Louisburg	---	---	---	---	---	2.0	3

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Soybeans	Wheat	Oats	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Bu	Ton	AUM*
27E---------- Louisburg	---	---	---	---	---	---	---
28B---------- Margo	120	23	35	25	50	3.5	7.0
29B---------- Masada	120	24	40	50	75	4.0	8.5
29C2---------- Masada	110	22	30	50	75	3.5	8.0
30B---------- Mattaponi	105	20	30	45	70	3.5	6.0
31C2---------- Mattaponi	75	14	20	35	50	2.5	4.0
32B---------- Nason	90	18	30	45	70	3.0	6.0
32C2---------- Nason	85	17	30	45	65	2.5	5.0
32D2---------- Nason	65	13	20	35	60	2.0	4.0
33B---------- Orange-Iredell	75	14	25	25	50	3.0	5.5
33C2---------- Orange-Iredell	60	10	20	25	50	2.5	5.0
34B---------- Partlow	80	16	35	---	---	3.0	6.0
35C---------- Poindexter	50	10	25	50	55	2.0	4.4
35D---------- Poindexter	---	---	---	---	---	---	3.7
35E---------- Poindexter	---	---	---	---	---	---	---
36A---------- Savannah	110	22	40	50	65	2.5	5.0
36B---------- Savannah	110	22	35	50	65	2.5	5.0
37B---------- Spotsylvania	120	24	45	55	70	3.5	8.0
37C---------- Spotsylvania	105	21	40	50	60	3.0	7.0
38B---------- Suffolk	125	25	35	40	60	3.5	8.0
39B---------- Tatum	90	18	30	50	70	3.0	6.0
39C2---------- Tatum	85	17	30	45	65	2.5	5.0
39D2---------- Tatum	65	13	20	35	60	2.0	4.5

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Soybeans	Wheat	Oats	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Bu	Ton	AUM*
40---------- Tetotum Variant	120	24	45	55	70	5.0	9.0
41---------- Toccoa	110	22	40	45	70	4.5	8.5
42B---------- Toddstav	---	---	---	---	---	3.0	6
43B---------- Turbeville	120	24	45	50	75	4.0	8.0
43C2---------- Turbeville	110	22	40	50	70	4.0	8.0
44**. Udorthents							
45B---------- Udorthents-Udifluvents	---	---	---	---	---	---	---
46---------- Urban land-Udults	---	---	---	---	---	---	---
47E---------- Watt	---	---	---	---	---	---	4.0
48A---------- Wickham	120	24	45	50	80	5.5	9.5
48B---------- Wickham	115	23	40	50	80	5.5	9.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
1B---------- Abell	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Loblolly pine, yellow-poplar, black walnut, eastern white pine.
						Yellow-poplar-------	90	
						Loblolly pine-------	90	
						Shortleaf pine------	80	
						Virginia pine-------	80	
2B---------- Altavista	2w	Slight	Moderate	Slight	Slight	Loblolly pine-------	91	Loblolly pine, yellow-poplar, black walnut.
						Shortleaf pine------	77	
						Sweetgum------------	84	
						White oak-----------	---	
3B---------- Appling	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	81	Eastern white pine, loblolly pine, yellow-poplar.
						Shortleaf pine------	66	
						Scarlet oak---------	68	
						Southern red oak----	76	
						Virginia pine-------	76	
						White oak-----------	76	
						Yellow-poplar-------	90	
4C2*:								
Appling----------	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	81	Eastern white pine, loblolly pine, yellow-poplar.
						Shortleaf pine------	66	
						Scarlet oak---------	68	
						Southern red oak----	70	
						Virginia pine-------	74	
						White oak-----------	70	
						Yellow-poplar-------	90	
Wedowee----------	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	80	Loblolly pine, shortleaf pine, yellow-poplar.
						Virginia pine-------	70	
						Shortleaf pine------	69	
						Southern red oak----	70	
						White oak-----------	65	
4D2*: Appling.								
Wedowee----------	3r	Moderate	Moderate	Slight	Slight	Loblolly pine-------	80	Loblolly pine, shortleaf pine, yellow-poplar.
						Virginia pine-------	70	
						Shortleaf pine------	69	
						Southern red oak----	70	
						White oak-----------	66	
7B*: Aquults.								
Margo----------	2w	Slight	Moderate	Slight	Slight	Maple---------------	65	Loblolly pine, yellow-poplar.
						Yellow-poplar-------	95	
						Sweetgum------------	95	
						Loblolly pine-------	95	
8B, 8C---------- Bama	2o	Slight	Slight	Slight	Slight	Loblolly pine-------	90	Loblolly pine, yellow-poplar.
						Virginia pine-------	60	
						Shortleaf pine------	75	
						White oak-----------	60	
9B---------- Brockroad	4o	Slight	Slight	Slight	Slight	Shortleaf pine------	56	Loblolly pine.
						Loblolly pine-------	70	
						Virginia pine-------	60	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
10---------- Cartecay	2w	Slight	Moderate	Slight	Slight	Loblolly pine------- Sweetgum---------- Yellow-poplar------- Water oak---------- Southern red oak----	95 95 95 85 85	Loblolly pine, yellow-poplar, poplar, water oak.
11B---------- Catharpin	4o	Slight	Slight	Slight	Slight	Shortleaf pine------ Loblolly pine------- Virginia pine------- Southern red oak----	56 70 60 60	Loblolly pine, eastern white pine.
12B---------- Cecil	3o	Slight	Slight	Slight	Slight	Eastern white pine-- Loblolly pine------- Shortleaf pine------ Virginia pine------- Black oak---------- Scarlet oak---------	80 80 69 73 66 70	Eastern white pine, loblolly pine, yellow-poplar.
13C2*: Cecil----------	3o	Slight	Slight	Slight	Slight	Eastern white pine-- Loblolly pine------- Shortleaf pine------ Virginia pine------- Black oak---------- Scarlet oak---------	80 80 69 73 66 70	Eastern white pine, loblolly pine, yellow-poplar.
Pacolet----------	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Yellow-poplar-------	78 70 85	Loblolly pine, shortleaf pine, yellow-poplar.
13D2*: Cecil----------	3r	Moderate	Moderate	Slight	Slight	Eastern white pine-- Loblolly pine------- Shortleaf pine------ Virginia pine------- Black oak---------- Scarlet oak---------	80 80 69 73 66 70	Eastern white pine, loblolly pine, yellow-poplar.
Pacolet----------	3r	Moderate	Moderate	Slight	Slight	Loblolly pine------- Shortleaf pine------ Yellow-poplar-------	78 70 90	Loblolly pine, shortleaf pine, yellow-poplar.
14B, 14C---------- Colfax	3w	Slight	Moderate	Slight	Moderate	Loblolly pine------- Red maple---------- Shortleaf pine------ Sweetgum---------- Yellow-poplar-------	80 66 70 80 80	Loblolly pine.
15B2, 15C2--------- Cullen	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Virginia pine------- Yellow-poplar------- White oak----------	80 70 70 80 60	Loblolly pine, eastern white pine.
15D2---------- Cullen	3r	Moderate	Moderate	Slight	Slight	Loblolly pine------- Shortleaf pine------ Virginia pine------- Yellow-poplar------- White oak----------	80 70 70 80 60	Loblolly pine, eastern white pine.
16---------- Dogue	2w	Slight	Moderate	Slight	Slight	Loblolly pine------- Southern red oak---- Sweetgum---------- Yellow-poplar------- White oak----------	90 80 90 95 80	Loblolly pine.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
18B, 18C---------- Emporia	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	76	Loblolly pine.
						Southern red oak----	70	
19B---------- Faceville	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	82	Loblolly pine.
20B*, 20C2*:								
Faceville---------	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	82	Loblolly pine.
						White oak----------	---	
Marlboro----------	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	82	Loblolly pine.
						White oak----------	---	
21B*, 21C2*:								
Faceville---------	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	82	Loblolly pine.
Varina----------	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	85	Loblolly pine.
						White oak----------	---	
22B, 22C2---------- Fluvanna	3o	Slight	Slight	Slight	Slight	Virginia pine-------	74	Loblolly pine.
						Shortleaf pine------	70	
						Northern red oak----	70	
22D2---------- Fluvanna	3r	Moderate	Moderate	Moderate	Slight	Virginia pine-------	74	Loblolly pine.
						Shortleaf pine------	70	
						Northern red oak----	70	
24---------- Goldsboro	2w	Slight	Moderate	Slight	Slight	Loblolly pine-------	90	Loblolly pine, yellow-poplar.
						Sweetgum-----------	90	
						Southern red oak----	---	
						White oak----------	---	
25B, 25C---------- Kempsville	3o	Slight	Slight	Slight	Slight	Southern red oak----	70	Loblolly pine, eastern white pine.
						Loblolly pine-------	80	
						Virginia pine-------	74	
						Sweetgum-----------	80	
						Yellow-poplar-------	80	
25D---------- Kempsville	3r	Moderate	Moderate	Slight	Slight	Southern red oak----	70	Loblolly pine, eastern white pine.
						Loblolly pine-------	80	
						Virginia pine-------	74	
						Sweetgum-----------	80	
						Yellow-poplar-------	80	
26C---------- LaRoque	4o	Slight	Slight	Slight	Slight	Virginia pine-------	65	Loblolly pine, eastern white pine.
						Chestnut oak--------	65	
						Southern red oak----	65	
26D---------- LaRoque	4o	Moderate	Moderate	Slight	Slight	Virginia pine-------	65	Loblolly pine, eastern white pine.
						Chestnut oak--------	65	
						Southern red oak----	65	
26E---------- LaRoque	4r	Severe	Severe	Slight	Slight	Virginia pine-------	75	Loblolly pine, eastern white pine.
						Chestnut oak--------	65	
						Southern red oak----	65	
27C, 27D---------- Louisburg	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	77	Loblolly pine.
						Shortleaf pine------	69	
						Southern red oak----	72	
						Yellow-poplar-------	84	
						Virginia pine-------	71	
						White pine----------	68	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
27E---------- Louisburg	3r	Moderate	Moderate	Slight	Slight	Loblolly pine-------	77	Loblolly pine.
						Shortleaf pine------	69	
						Southern red oak----	72	
						Yellow-poplar-------	84	
						Virginia pine-------	71	
						White oak-----------	68	
28B---------- Margo	2w	Slight	Moderate	Slight	Slight	Maple---------------	65	Loblolly pine, yellow-poplar.
						Yellow-poplar-------	95	
						Sweetgum------------	95	
						Loblolly pine-------	95	
29B, 29C2---------- Masada	3o	Slight	Slight	Slight	Slight	Southern red oak----	70	Eastern white pine, loblolly pine, yellow-poplar.
						Virginia pine-------	70	
						Shortleaf pine------	70	
						Yellow-poplar-------	85	
						Eastern white pine--	80	
						Loblolly pine-------	82	
30B, 31C2---------- Mattaponi	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	80	Loblolly pine, shortleaf pine.
32B, 32C2---------- Nason	3o	Slight	Slight	Slight	Slight	Virginia pine-------	69	Loblolly pine, eastern white pine.
						Shortleaf pine------	66	
						Loblolly pine-------	80	
32D2---------- Nason	3r	Moderate	Moderate	Slight	Slight	Virginia pine-------	69	Loblolly pine, eastern white pine.
						Shortleaf pine------	66	
						Loblolly pine-------	80	
33B*:								
Orange----------	4w	Slight	Moderate	Moderate	Moderate	Virginia pine-------	60	Loblolly pine.
						Shortleaf pine------	60	
						Loblolly pine-------	75	
Iredell----------	4c	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	67	Loblolly pine, eastern redcedar.
						Shortleaf pine------	58	
33C2*:								
Orange----------	4w	Moderate	Moderate	Moderate	Moderate	Virginia pine-------	60	Loblolly pine.
						Shortleaf pine------	60	
						Loblolly pine-------	75	
Iredell----------	4c	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	67	Loblolly pine, eastern redcedar.
						Shortleaf pine------	58	
34B---------- Partlow	3w	Slight	Severe	Severe	Moderate	Sweetgum------------	75	Loblolly pine.
						Willow oak----------	70	
						Water oak-----------	70	
						Maple---------------	65	
35C---------- Poindexter	4o	Slight	Slight	Slight	Slight	Shortleaf pine------	60	Loblolly pine.
						Virginia pine-------	65	
						Southern red oak----	60	
						Loblolly pine-------	70	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
35D---------- Poindexter	4r	Moderate	Moderate	Slight	Slight	Shortleaf pine------	60	Loblolly pine.
						Virginia pine-------	65	
						Southern red oak----	60	
						Loblolly pine-------	70	
35E---------- Poindexter	4r	Severe	Severe	Slight	Slight	Shortleaf pine------	60	Loblolly pine.
						Virginia pine-------	65	
						Southern red oak----	60	
						Loblolly pine-------	70	
36A, 36B---------- Savannah	3w	Slight	Moderate	Slight	Moderate	Loblolly pine-------	76	Loblolly pine, eastern white pine.
						Northern red oak----	65	
						Virginia pine-------	60	
37B, 37C---------- Spotsylvania	3o	Slight	Slight	Slight	Slight	Shortleaf pine------	65	Loblolly pine, eastern white pine, yellow-poplar.
						Loblolly pine-------	80	
						Virginia pine-------	70	
						Northern red oak----	70	
38B---------- Suffolk	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	82	Loblolly pine.
						Shortleaf pine------	72	
						Southern red oak----	70	
39B, 39C2---------- Tatum	3o	Slight	Slight	Slight	Slight	Virginia pine-------	68	Loblolly pine, eastern white pine, yellow-poplar.
						Shortleaf pine------	68	
						Loblolly pine-------	78	
						Yellow-poplar-------	83	
39D2---------- Tatum	3r	Moderate	Moderate	Slight	Slight	Virginia pine-------	68	Loblolly pine, eastern white pine, yellow-poplar.
						Shortleaf pine------	68	
						Loblolly pine-------	78	
						Yellow-poplar-------	83	
40---------- Tetotum Variant	2w	Slight	Moderate	Slight	Slight	Loblolly pine-------	91	Loblolly pine, yellow-poplar, black walnut.
						Shortleaf pine------	77	
						Sweetgum-----------	84	
						White oak----------	---	
41---------- Toccoa	1o	Slight	Slight	Slight	Slight	Loblolly pine-------	96	Loblolly pine, yellow-poplar.
						Yellow-poplar-------	107	
						Sweetgum-----------	100	
						Southern red oak----	---	
42B---------- Toddstav	3w	Slight	Severe	Severe	Moderate	Red maple----------	65	Loblolly pine.
						Sweetgum-----------	75	
						Willow oak---------	75	
						Southern red oak----	75	
43B, 43C2---------- Turbeville	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	80	Loblolly pine, yellow-poplar.
						Yellow-poplar-------	85	
						Virginia pine-------	70	
						Shortleaf pine------	70	
						Southern red oak----	70	
47E---------- Watt	4r	Moderate	Moderate	Severe	Moderate	Virginia pine-------	60	Loblolly pine.
						Shortleaf pine------	60	
						White oak----------	---	
48A, 48B---------- Wickham	2o	Slight	Slight	Slight	Slight	Loblolly pine-------	90	Loblolly pine, yellow-poplar.
						Yellow-poplar-------	100	
						Southern red oak----	---	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1B Abell	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Slight	Slight.
2B Altavista	Severe: flooding.	Moderate: wetness.	Moderate: slope, wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
3B Appling	Slight	Slight	Moderate: slope.	Slight	Slight.
4C2*: Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Wedowee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
4D2*: Appling	Severe: slope.	Severe: slope.	Severe: slope.	Slight	Severe: slope.
Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
5*, 6*. Aquults					
7B*: Aquults.					
Margo	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: flooding, wetness.
8B Bama	Slight	Slight	Moderate: slope.	Slight	Slight.
8C Bama	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
9B Brockroad	Slight	Slight	Moderate: small stones, slope.	Slight	Slight.
10 Cartecay	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness.	Severe: flooding.
11B Catharpin	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
12B Cecil	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
13C2*: Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
13C2*: Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
13D2*: Cecil	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Slight.
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
14B Colfax	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
14C Colfax	Severe: wetness.	Moderate: slope, wetness, percs slowly.	Severe: slope, wetness.	Severe: erodes easily.	Moderate: slope, wetness.
15B2 Cullen	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
15C2 Cullen	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
15D2 Cullen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
16 Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness.	Moderate: wetness.	Moderate: wetness.
17C*, 17D*, 17E*: Dystrochrepts. Udults.					
18B Emporia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
18C Emporia	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
19B Faceville	Slight	Slight	Moderate: slope.	Slight	Slight.
20B*: Faceville	Slight	Slight	Moderate: slope.	Slight	Slight.
Marlboro	Slight	Slight	Moderate: slope.	Slight	Slight.
20C2*: Faceville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Marlboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
21B*: Faceville	Slight	Slight	Moderate: slope.	Slight	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
21B*: Varina	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Moderate: droughty.
21C2*: Faceville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Varina	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: droughty, slope.
22B Fluvanna	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
22C2 Fluvanna	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
22D2 Fluvanna	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
23*: Fluvaquents. Udifluvents.					
24 Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
25B Kempsville	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty.
25C Kempsville	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty, slope.
25D Kempsville	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
26C LaRoque	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
26D LaRoque	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
26E LaRoque	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
27C, 27D Louisburg	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
27E Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
28B Margo	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: flooding, wetness.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
29B---------- Masada	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
29C2---------- Masada	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
30B---------- Mattaponi	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Slight.
31C2---------- Mattaponi	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
32B---------- Nason	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
32C2---------- Nason	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
32D2---------- Nason	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
33B*: Orange----------	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Iredell----------	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
33C2*: Orange----------	Severe: wetness.	Moderate: slope, wetness, percs slowly.	Severe: slope, wetness.	Severe: erodes easily.	Moderate: slope, wetness.
Iredell----------	Severe: wetness.	Moderate: wetness, slope.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness, slope.
34B---------- Partlow	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
35C---------- Poindexter	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
35D---------- Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
35E---------- Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
36A---------- Savannah	Severe: percs slowly.	Severe: percs slowly.	Moderate: small stones, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
36B---------- Savannah	Severe: percs slowly.	Severe: percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
37B---------- Spotsylvania	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
37C---------- Spotsylvania	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
38B---------- Suffolk	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
39B---------- Tatum	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
39C2---------- Tatum	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
39D2---------- Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
40---------- Tetotum Variant	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
41---------- Toccoa	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
42B---------- Toddstav	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
43B---------- Turbeville	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Moderate: large stones.
43C2---------- Turbeville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: large stones, slope.
44*. Udorthents					
45B*: Udorthents. Udifluvents.					
46*: Urban land. Udults.					
47E---------- Watt	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
48A---------- Wickham	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
48B---------- Wickham	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1B---------- Abell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
2B---------- Altavista	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3B---------- Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
4C2*:										
Appling----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Wedowee----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
4D2*:										
Appling.										
Wedowee----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
5*, 6*. Aquults										
7B*:										
Aquults.										
Margo----------	Good	Good	Fair	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8B---------- Bama	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8C---------- Bama	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
9B---------- Brockroad	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
10---------- Cartecay	Poor	Fair	Fair	Good	Good	Fair	Poor	Fair	Good	Fair.
11B---------- Catharpin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
12B---------- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
13C2*:										
Cecil----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pacolet----------	Fair	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
13D2*:										
Cecil----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Pacolet----------	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
14B---------- Colfax	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
14C---------- Colfax	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
15B2---------- Cullen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
15C2---------- Cullen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
15D2---------- Cullen	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
16---------- Dogue	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
17C*, 17D*, 17E*: Dystrochrepts.										
Udults.										
18B---------- Emporia	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
18C---------- Emporia	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
19B---------- Faceville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
20B*:										
Faceville---------	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Marlboro----------	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
20C2*:										
Faceville---------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Marlboro----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
21B*:										
Faceville---------	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Varina----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
21C2*:										
Faceville---------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Varina----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
22B---------- Fluvanna	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
22C2---------- Fluvanna	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
22D2--- Fluvanna	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
23*: Fluvaquents.										
Udifluvents.										
24--- Goldsboro	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
25B--- Kempsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
25C--- Kempsville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
25D--- Kempsville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
26C--- LaRoque	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
26D--- LaRoque	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
26E--- LaRoque	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
27C, 27D--- Louisburg	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
27E--- Louisburg	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
28B--- Margo	Good	Good	Fair	Good	Good	Poor	Very poor.	Good	Good	Very poor.
29B--- Masada	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
29C2--- Masada	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
30B--- Mattaponi	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
31C2--- Mattaponi	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
32B--- Nason	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
32C2--- Nason	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
32D2--- Nason	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
33B*: Orange---	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Iredell---	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
33C2*: Orange	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Iredell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
34B Partlow	Poor	Fair	Fair	Fair	Fair	Good	Fair	Poor	Fair	Fair.
35C Poindexter	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
35D Poindexter	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
35E Poindexter	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
36A Savannah	Fair	Good	Good	Fair	Fair	Poor	Poor	Good	Fair	Poor.
36B Savannah	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
37B Spotsylvania	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
37C Spotsylvania	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
38B Suffolk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
39B Tatum	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
39C2 Tatum	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
39D2 Tatum	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
40 Tetotum Variant	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
41* Toccoa	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
42B Toddstav	Poor	Fair	Fair	Good	Fair	Good	Fair	Fair	Good	Fair.
43B Turbeville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
43C2 Turbeville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
44*. Udorthents										
45B*: Udorthents.										
Udifluvents.										

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
46*: Urban land. Udults.										
47E---------- Watt	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
48A---------- Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
48B---------- Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1B--- Abell	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness, shrink-swell.	Slight.
2B--- Altavista	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
3B--- Appling	Moderate: too clayey.	Slight---	Slight---	Moderate: slope.	Moderate: low strength.	Slight.
4C2*: Appling---	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
Wedowee---	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
4D2*: Appling---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, low strength.	Severe: slope.
Wedowee---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
5*, 6*. Aquults						
7B*: Aquults.						
Margo---	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.
8B--- Bama	Slight---	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
8C--- Bama	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
9B--- Brockroad	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
10--- Cartecay	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding.
11B--- Catharpin	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
12B--- Cecil	Moderate: too clayey.	Slight---	Slight---	Moderate: slope.	Moderate: low strength.	Slight.
13C2*: Cecil---	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Slight.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
13C2*: Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
13D2*: Cecil	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Slight.
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
14B Colfax	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
14C Colfax	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Moderate: slope, wetness.
15B2 Cullen	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
15C2 Cullen	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
15D2 Cullen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
16 Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
17C*, 17D*, 17E*: Dystrochrepts.						
Udults.						
18B Emporia	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Moderate: low strength.	Slight.
18C Emporia	Moderate: slope, wetness.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
19B Faceville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
20B*: Faceville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Marlboro	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
20C2*: Faceville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Marlboro	Moderate: too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
21B*: Faceville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Varina	Moderate: too clayey, wetness.	Slight	Moderate: wetness.	Moderate: slope.	Moderate: low strength.	Moderate: droughty.
21C2*: Faceville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Varina	Moderate: too clayey, wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: droughty, slope.
22B Fluvanna	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
22C2 Fluvanna	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
22D2 Fluvanna	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
23*: Fluvaquents. Udifluvents.						
24 Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
25B Kempsville	Slight	Slight	Slight	Moderate: slope.	Slight	Moderate: small stones, droughty.
25C Kempsville	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, droughty, slope.
25D Kempsville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
26C LaRoque	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope, thin layer.
26D, 26E LaRoque	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
27C, 27D Louisburg	Moderate: depth to rock.	Moderate: slope.	Moderate: depth to rock.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
27E Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
28B Margo	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
29B---------- Masada	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
29C2---------- Masada	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
30B---------- Mattaponi	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
31C2---------- Mattaponi	Moderate: too clayey, wetness.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
32B---------- Nason	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
32C2---------- Nason	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
32D2---------- Nason	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
33B*: Orange----------	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
Iredell----------	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
33C2*: Orange----------	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: slope, shrink-swell, wetness.	Severe: low strength, shrink-swell.	Moderate: slope, wetness.
Iredell----------	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: wetness, slope.
34B---------- Partlow	Severe: ponding, flooding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: ponding, flooding.
35C---------- Poindexter	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Moderate: slope.
35D, 35E---------- Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
36A---------- Savannah	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
36B---------- Savannah	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Moderate: wetness.
37B---------- Spotsylvania	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
37C---------- Spotsylvania	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
38B---------- Suffolk	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
39B---------- Tatum	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
39C2---------- Tatum	Moderate: slope, too clayey.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
39D2---------- Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
40---------- Tetotum Variant	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
41---------- Toccoa	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
42B---------- Toddstav	Severe: ponding, flooding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
43B---------- Turbeville	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
43C2---------- Turbeville	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
44*. Udorthents						
45B*: Udorthents.						
Udifluvents.						
46*: Urban land.						
Udults.						
47E---------- Watt	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
48A, 48B---------- Wickham	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1B---------- Abell	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: too clayey, wetness.
2B---------- Altavista	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
3B---------- Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
4C2*: Appling----------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Wedowee----------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, thin layer.
4D2*: Appling----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wedowee----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
5*, 6*. Aquults					
7B*: Aquults.					
Margo----------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
8B---------- Bama	Slight----------	Moderate: seepage, slope.	Slight----------	Slight----------	Good.
8C---------- Bama	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
9B---------- Brockroad	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
10---------- Cartecay	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
11B---------- Catharpin	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
12B---------- Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
13C2*: Cecil----------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Pacolet----------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
13D2*: Cecil----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Pacolet----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
14B---------- Colfax	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: area reclaim, wetness.
14C---------- Colfax	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: area reclaim, wetness.
15B2---------- Cullen	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
15C2---------- Cullen	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
15D2---------- Cullen	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
16---------- Dogue	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
17C*, 17D*, 17E*: Dystrochrepts. Udults.					
18B---------- Emporia	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Moderate: wetness, too clayey.	Slight----------	Fair: too clayey, wetness.
18C---------- Emporia	Severe: wetness, percs slowly.	Severe: seepage, slope, wetness.	Moderate: slope, wetness, too clayey.	Moderate: slope.	Fair: slope, too clayey, wetness.
19B---------- Faceville	Slight----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
20B*: Faceville	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Marlboro	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
20C2*: Faceville	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Marlboro	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
21B*: Faceville	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Varina	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
21C2*: Faceville	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Varina	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, hard to pack.
22B Fluvanna	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
22C2 Fluvanna	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
22D2 Fluvanna	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
23*: Fluvaquents. Udifluvents.					
24 Goldsboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
25B Kempsville	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
25C Kempsville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
25D Kempsville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
26C---------- LaRoque	Severe: depth to rock.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, thin layer.
26D, 26E---------- LaRoque	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, thin layer, slope.
27C, 27D---------- Louisburg	Moderate: depth to rock.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: slope.
27E---------- Louisburg	Severe: slope.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: slope.
28B---------- Margo	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
29B---------- Masada	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
29C2---------- Masada	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
30B---------- Mattaponi	Severe: wetness, percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Severe: too clayey, hard to pack.
31C2---------- Mattaponi	Severe: wetness, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Severe: too clayey, hard to pack.
32B---------- Nason	Moderate: depth to rock, percs slowly.	Moderate: slope, seepage, depth to rock.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
32C2---------- Nason	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
32D2---------- Nason	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
33B*: Orange----------	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Iredell----------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
33C2*: Orange----------	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
33C2*: Iredell	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
34B Partlow	Severe: flooding, ponding.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding.
35C Poindexter	Moderate: depth to rock, slope.	Severe: slope, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: slope, too clayey, area reclaim.
35D, 35E Poindexter	Severe: slope.	Severe: slope, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope.
36A, 36B Savannah	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
37B Spotsylvania	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
37C Spotsylvania	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
38B Suffolk	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey, thin layer.
39B Tatum	Moderate: depth to rock, percs slowly.	Moderate: slope, seepage, depth to rock.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
39C2 Tatum	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
39D2 Tatum	Severe: slope.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
40 Tetotum Variant	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
41 Toccoa	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Good.
42B Toddstav	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
43B---------- Turbeville	Moderate: percs slowly.	Moderate: slope, large stones.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
43C2---------- Turbeville	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
44*. Udorthents					
45B*: Udorthents.					
Udifluvents.					
46*: Urban land.					
Udults.					
47E---------- Watt	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope, small stones.
48A, 48B---------- Wickham	Slight----------	Moderate: seepage.	Severe: seepage.	Slight----------	Fair: thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1B---------- Abell	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, small stones.
2B---------- Altavista	Fair: wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
3B---------- Appling	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
4C2*:				
Appling----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Wedowee----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
4D2*:				
Appling----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Wedowee----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
5*, 6*. Aquults				
7B*: Aquults.				
Margo----------	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
8B---------- Bama	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
8C---------- Bama	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
9B---------- Brockroad	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
10---------- Cartecay	Fair: wetness.	Probable----------	Improbable: too sandy.	Fair: wetness.
11B---------- Catharpin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
12B---------- Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
13C2*:				
Cecil----------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Pacolet----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
13D2*:				
Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Pacolet	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
14B				
Colfax	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
14C				
Colfax	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer, slope.
15B2, 15C2				
Cullen	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
15D2				
Cullen	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
16				
Dogue	Poor: low strength.	Probable	Improbable: too sandy.	Poor: thin layer.
17C*, 17D*, 17E*:				
Dystrochrepts.				
Udults.				
18B				
Emporia	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
18C				
Emporia	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
19B				
Faceville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
20B*, 20C2*:				
Faceville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Marlboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
21B*, 21C2*:				
Faceville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Varina	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
22B, 22C2				
Fluvanna	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
22D2				
Fluvanna	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
23*:				
Fluvaquents.				
Udifluvents.				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
24---------- Goldsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
25B, 25C---------- Kempsville	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
25D---------- Kempsville	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
26C---------- LaRoque	Poor: area reclaim, slope.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Fair: area reclaim, thin layer, slope.
26D, 26E---------- LaRoque	Poor: area reclaim, slope.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: slope.
27C, 27D---------- Louisburg	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
27E---------- Louisburg	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
28B---------- Margo	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
29B, 29C2---------- Masada	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
30B, 31C2---------- Mattaponi	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
32B, 32C2---------- Nason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
32D2---------- Nason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
33B*, 33C2*: Orange----------	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Iredell----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
34B---------- Partlow	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
35C---------- Poindexter	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
35D---------- Poindexter	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
35E---------- Poindexter	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
36A, 36B---------- Savannah	Fair: low strength, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, thin layer.
37B, 37C---------- Spotsylvania	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
38B---------- Suffolk	Good----------	Probable----------	Improbable: too sandy.	Fair: small stones.
39B, 39C2---------- Tatum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
39D2---------- Tatum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
40---------- Tetotum Variant	Fair: wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
41---------- Toccoa	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
42B---------- Toddstav	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
43B, 43C2---------- Turbeville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
44*. Udorthents				
45B*: Udorthents.				
Udifluvents.				
46*: Urban land.				
Udults.				
47E---------- Watt	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, thin layer, slope.
48A, 48B---------- Wickham	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
1B---------- Abell	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Slope----------	Slope, wetness.	Favorable.
2B---------- Altavista	Moderate: seepage.	Moderate: wetness.	Moderate: deep to water.	Flooding, slope.	Wetness, slope.	Favorable.
3B---------- Appling	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Favorable.
4C2*: Appling----------	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
Wedowee----------	Slight---------	Moderate: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
4D2*: Appling----------	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
Wedowee----------	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
5*, 6*. Aquults						
7B*: Aquults.						
Margo----------	Moderate: slope.	Severe: wetness.	Moderate: slow refill.	Flooding, slope.	Wetness, erodes easily, flooding.	Wetness, erodes easily.
8B---------- Bama	Moderate: seepage, slope.	Slight---------	Severe: no water.	Deep to water	Slope----------	Favorable.
8C---------- Bama	Severe: slope.	Slight---------	Severe: no water.	Deep to water	Slope----------	Slope.
9B---------- Brockroad	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Favorable.
10---------- Cartecay	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding-------	Wetness, flooding.	Wetness.
11B---------- Catharpin	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Favorable.
12B---------- Cecil	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Favorable.
13C2*: Cecil----------	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
Pacolet----------	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
13D2*:						
Cecil	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.
Pacolet	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.
14B---- Colfax	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, wetness.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, rooting depth.	Wetness, erodes easily, rooting depth.
14C---- Colfax	Severe: slope.	Moderate: thin layer, wetness.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, rooting depth.	Wetness, slope, erodes easily.
15B2---- Cullen	Moderate: seepage, slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Erodes easily.
15C2, 15D2---- Cullen	Severe: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
16---- Dogue	Moderate: seepage.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Favorable	Wetness, erodes easily.	Erodes easily.
17C*, 17D*, 17E*: Dystrochrepts. Udults.						
18B---- Emporia	Moderate: seepage, slope.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Soil blowing, slope.	Percs slowly.
18C---- Emporia	Severe: slope.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Soil blowing, slope.	Slope, percs slowly.
19B---- Faceville	Moderate: seepage.	Slight	Severe: no water.	Deep to water	Slope	Favorable.
20B*:						
Faceville	Moderate: seepage.	Slight	Severe: no water.	Deep to water	Slope	Favorable.
Marlboro	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Soil blowing, slope.	Favorable.
20C2*:						
Faceville	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope	Slope.
Marlboro	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Soil blowing, slope.	Slope.
21B*:						
Faceville	Moderate: seepage.	Slight	Severe: no water.	Deep to water	Slope	Favorable.
Varina	Slight	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope	Favorable.
21C2*:						
Faceville	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope	Slope.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
21C2*: Varina	Slight	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.
22B Fluvanna	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.
22C2, 22D2 Fluvanna	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.
23*: Fluvaquents. Udifluvents.						
24 Goldsboro	Moderate: seepage.	Moderate: wetness.	Moderate: deep to water.	Favorable	Wetness	Favorable.
25B Kempsville	Moderate: seepage, slope.	Slight	Severe: no water.	Deep to water	Droughty, slope.	Droughty.
25C, 25D Kempsville	Severe: slope.	Slight	Severe: no water.	Deep to water	Droughty, slope.	Slope, droughty.
26C, 26D, 26E LaRoque	Poor: seepage, slope.	Severe: thin layer, seepage, piping.	Severe: no water.	Deep to water	Depth to rock, slope, erodes easily.	Slope, erodes easily, depth to rock.
27C, 27D, 27E Louisburg	Severe: seepage.	Moderate: piping, erodes easily.	Severe: no water.	Deep to water	Slope	Slope.
28B Margo	Moderate: slope.	Severe: wetness.	Moderate: slow refill.	Flooding, slope.	Wetness, erodes easily, flooding.	Wetness, erodes easily.
29B Masada	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Favorable.
29C2 Masada	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.
30B Mattaponi	Moderate: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope	Favorable.
31C2 Mattaponi	Severe: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.
32B Nason	Moderate: seepage, depth to rock, slope.	Severe: thin layer, hard to pack.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily.
32C2, 32D2 Nason	Severe: slope.	Severe: thin layer, hard to pack.	Severe: no water.	Deep to water	Erodes easily, slope.	Slope, erodes easily.
33B*: Orange	Moderate: depth to rock, slope.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, slope.	Wetness, percs slowly, slope.	Wetness, erodes easily.
Iredell	Moderate: depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
33C2*: Orange	Severe: slope.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, slope.	Wetness, percs slowly, slope.	Wetness, slope, erodes easily.
Iredell	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Wetness, slope, percs slowly.
34B Partlow	Severe: seepage.	Severe: ponding, piping.	Slight	Slope, ponding, flooding.	Slope, ponding, flooding.	Wetness.
35C, 35D, 35E Poindexter	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
36A Savannah	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: no water.	Percs slowly	Wetness, soil blowing, percs slowly.	Erodes easily, rooting depth, percs slowly.
36B Savannah	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Severe: no water.	Percs slowly, slope.	Wetness, soil blowing, percs slowly.	Erodes easily, rooting depth, percs slowly.
37B Spotsylvania	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Favorable.
37C Spotsylvania	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.
38B Suffolk	Moderate: seepage, slope.	Severe: piping, thin layer.	Severe: no water.	Deep to water	Soil blowing, slope.	Favorable.
39B Tatum	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Erodes easily.
39C2, 39D2 Tatum	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
40 Tetotum Variant	Moderate: seepage.	Moderate: wetness.	Moderate: deep to water.	Flooding	Wetness	Favorable.
41 Toccoa	Severe: seepage.	Severe: piping.	Moderate: deep to water.	Flooding	Flooding	Favorable.
42B Toddstav	Moderate: seepage.	Severe: ponding.	Moderate: slow refill.	Percs slowly, flooding, slope.	Ponding, percs slowly, flooding.	Wetness, percs slowly.
43B Turbeville	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Favorable.
43C2 Turbeville	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.
44*. Udorthents						
45B*: Udorthents.						
Udifluvents.						

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
46*: Urban land. Udults.						
47E---------- Watt	Severe: seepage, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Large stones, slope, droughty.
48A---------- Wickham	Moderate: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Favorable------	Favorable.
48B---------- Wickham	Moderate: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope----------	Favorable.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1B---------- Abell	0-12	Sandy loam-------	SM, ML	A-2, A-4	0	90-100	75-100	50-95	25-85	<30	NP-7
	12-47	Sandy clay loam, clay loam, sandy loam.	CL, CL-ML, SM-SC, SC	A-2, A-4, A-6	0	90-100	75-100	50-95	25-85	<40	NP-20
	47-62	Clay, clay loam, silty clay loam.	CL, CH	A-6, A-7	0-5	90-100	75-95	70-95	65-90	30-60	15-30
	62-75	Loam, sandy loam	SM, ML	A-2, A-4	0-5	75-100	75-95	60-90	30-75	<30	NP-7
2B---------- Altavista	0-11	Sandy loam-------	ML, CL-ML, SM, SM-SC	A-4	0	95-100	90-100	65-99	35-60	<23	NP-7
	11-52	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	52-80	Variable---------	---	---	0	---	---	---	---	---	---
3B---------- Appling	0-9	Sandy loam-------	SM, SM-SC	A-2	0-5	86-100	80-100	55-75	15-35	<27	NP-5
	9-39	Sandy clay, clay loam, clay.	MH, ML	A-7	0-5	95-100	95-100	70-92	51-80	41-74	15-30
	39-47	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	95-100	95-100	70-90	40-75	25-45	8-22
	47-80	Weathered bedrock	---	---	---	---	---	---	---	---	---
4C2*, 4D2*: Appling---------	0-9	Sandy loam-------	SM, SM-SC	A-2	0-5	86-100	80-100	55-75	15-35	<27	NP-5
	9-39	Sandy clay, clay loam, clay.	MH, ML	A-7	0-5	95-100	95-100	70-92	51-80	41-74	15-30
	39-47	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	95-100	95-100	70-90	40-75	25-45	8-22
	47-80	Weathered bedrock	---	---	---	---	---	---	---	---	---
Wedowee---------	0-6	Sandy loam-------	SM, SM-SC	A-4, A-2-4	0	95-100	90-100	60-99	23-50	<30	NP-6
	6-10	Loam, sandy clay loam.	SM, SC, CL, ML	A-4, A-6	0	90-100	90-100	80-97	40-75	<32	NP-15
	10-33	Sandy clay, clay loam, clay.	SC, ML, CL, SM	A-6, A-7	0	95-100	95-100	65-97	45-71	30-58	10-25
	33-75	Variable---------	---	---	---	---	---	---	---	---	---
5*. Aquults											
6*. Aquults											
7B*: Aquults.											
Margo----------	0-9	Loam----------	ML, CL, CL-ML	A-4	0	98-100	90-100	85-100	60-90	<30	NP-10
	9-42	Loam, silt loam, silty clay loam.	CL-ML, CL	A-4, A-5, A-6, A-7	0	98-100	90-100	80-100	60-95	25-45	5-20
	42-45	Gravelly loam, gravelly silt loam, gravelly silty clay loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-5, A-7	0	55-80	50-95	40-70	30-65	25-50	5-25
	45-60	Sandy loam, loam, silty clay loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-5, A-7	0	98-100	90-100	60-100	30-90	20-45	5-20

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
8B, 8C---------- Bama	0-14	Sandy loam-------	SM, SC, SM-SC, CL-ML	A-2, A-4	0	95-100	85-100	70-95	30-70	<30	NP-10
	14-68	Loam, sandy clay loam.	SM, SC, SM-SC, CL-ML	A-4, A-6	0	90-100	85-100	80-95	36-70	15-35	2-15
	68-86	Loam, sandy clay loam, clay loam.	SC, CL	A-4, A-6	0	85-100	80-100	80-95	40-70	20-40	8-18
9B---------- Brockroad	0-9	Silt loam--------	ML, CL	A-4, A-6	0	80-100	75-95	70-95	60-90	15-35	NP-15
	9-59	Clay, silty clay, silty clay loam.	MH, CH	A-7	0-5	80-100	75-95	70-95	65-90	50-75	20-50
	59-75	Silt loam, loam, clay.	MH, CH, ML, CL	A-6, A-7	0-10	65-85	55-75	50-75	40-70	30-65	11-40
	75-80	Weathered bedrock	---	---	---	---	---	---	---	---	---
10---------- Cartecay	0-11	Sandy loam-------	SM	A-2, A-4	0	90-100	75-100	60-80	20-50	---	NP
	11-52	Sandy loam, fine sandy loam, loam.	SM, SC, SM-SC	A-2, A-4	0	90-100	75-100	60-85	25-50	<30	NP-10
	52-88	Loamy sand, sand, sandy loam.	SM, SP-SM	A-2, A-1	0	80-100	35-95	25-80	5-35	---	NP
11B---------- Catharpin	0-9	Silt loam--------	CL-ML, CL, SM-SC	A-4, A-6	0-5	90-100	75-95	45-75	35-70	25-40	5-15
	9-54	Clay, silty clay loam, clay loam.	CL, CH, MH	A-7	0-5	90-100	75-95	70-90	55-85	45-85	20-45
	54-76	Clay, clay loam, silty clay loam.	MH, CH, CL	A-7	0-10	85-95	75-90	70-90	55-80	40-80	15-40
	76-99	Clay, channery clay, channery silt loam.	ML, MH, SM, GM	A-4, A-6, A-7	5-15	60-90	50-85	45-80	40-70	20-70	NP-30
12B---------- Cecil	0-13	Loam----------	SM, SM-SC	A-2, A-4	0	84-100	80-100	67-90	26-42	<30	NP-6
	13-46	Clay, clay loam	MH, ML	A-7, A-5	0	97-100	92-100	72-99	55-95	41-80	9-37
	46-74	Variable---------	---	---	---	---	---	---	---	---	---
13C2*, 13D2*: Cecil----------	0-13	Loam----------	SM, SM-SC	A-2, A-4	0	84-100	80-100	67-90	26-42	<30	NP-6
	13-46	Clay----------	MH, ML	A-7, A-5	0	97-100	92-100	72-99	55-95	41-80	9-37
	46-74	Variable---------	---	---	---	---	---	---	---	---	---
Pacolet---------	0-7	Sandy clay loam	SM-SC, SC	A-4, A-6	0-1	95-100	90-100	65-85	36-50	20-40	4-17
	7-27	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	27-64	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SM-SC, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
14B, 14C---------- Colfax	0-7	Sandy loam-------	ML, SM, CL-ML, SM-SC	A-4	0	95-100	90-100	60-90	40-80	10-30	NP-10
	7-25	Sandy clay loam, clay loam, loam.	SC, CL, SM, ML	A-4, A-6	0	90-100	85-100	75-90	40-80	25-45	7-25
	25-37	Sandy loam, fine sandy loam, clay loam.	ML, CL, SM, SC	A-2, A-4	0	95-100	90-100	60-90	30-70	20-40	NP-20
	37-60	Sandy loam-------	SM, SC	A-2, A-4	0-10	90-100	90-100	45-65	25-45	10-25	NP-10
15B2, 15C2, 15D2- Cullen	0-8	Loam----------	CL	A-6, A-7, A-4	0	90-100	85-100	75-95	50-75	25-40	7-20
	8-38	Clay, clay loam	MH	A-7	0	90-100	85-100	75-100	65-95	50-70	15-35
	38-67	Clay loam, clay, loam.	CH, MH, CL, ML	A-7, A-6	0	90-100	85-100	75-100	50-85	35-60	11-30

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
16---------- Dogue	0-10	Loam----------	ML, CL, SM, SC	A-4	0	95-100	75-100	60-100	40-85	<30	NP-10
	10-53	Clay loam, clay, sandy clay loam.	CL, CH, SC	A-6, A-7	0	95-100	75-100	65-100	40-90	35-60	16-40
	53-65	Stratified sand to sandy clay loam.	SM, SC, SP-SM, SM-SC	A-2, A-4, A-1	0	80-100	60-100	35-100	10-40	<30	NP-10
17C*, 17D*, 17E*: Dystrochrepts.											
Udults.											
18B, 18C---------- Emporia	0-9	Sandy loam-------	CL, SC, SM, ML	A-2, A-4, A-6	0-3	90-100	80-100	50-95	25-65	<25	NP-15
	9-59	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	80-100	45-95	25-70	20-50	8-30
	59-72	Sandy clay loam, clay loam, sandy clay.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	80-100	45-95	30-80	25-50	8-30
19B---------- Faceville	0-10	Loam----------	SM	A-2	0	90-100	85-100	72-97	13-25	---	NP
	10-87	Sandy clay, clay, clay loam.	CL, SC, CH	A-6, A-7	0	98-100	95-100	60-99	43-72	25-59	11-32
20B*, 20C2*:											
Faceville-------	0-10	Loam----------	SM	A-2	0	90-100	85-100	72-97	13-25	---	NP
	10-87	Sandy clay, clay, clay loam.	CL, SC, CH	A-6, A-7	0	98-100	95-100	60-99	43-72	25-59	11-32
Marlboro--------	0-15	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	0	98-100	95-100	75-100	30-60	<35	NP-7
	15-60	Sandy clay, clay loam, clay.	CL, ML, CL-ML	A-4, A-6, A-7	0	98-100	95-100	78-100	51-70	25-48	6-20
	60-72	Sandy clay loam, sandy clay, clay.	CL, ML, SM, SC	A-4, A-6, A-7	0	98-100	95-100	74-100	45-70	24-48	6-20
21B*, 21C2*:											
Faceville-------	0-10	Loam----------	SM	A-2	0	90-100	85-100	72-97	13-25	---	NP
	10-87	Sandy clay, clay, clay loam.	CL, SC, CH	A-6, A-7	0	98-100	95-100	60-99	43-72	25-59	11-32
Varina----------	0-13	Sandy loam-------	SM, SM-SC	A-2, A-4	0	95-100	92-100	75-95	20-49	<25	NP-7
	13-31	Sandy clay, clay loam, clay.	SC, MH, ML, SM	A-6, A-7	0	95-100	92-100	80-95	36-65	36-60	11-25
	31-89	Sandy clay, clay loam, clay.	SC, CL, CH	A-4, A-6, A-7	0	95-100	92-100	75-95	36-68	28-53	8-26
22B, 22C2, 22D2-- Fluvanna	0-10	Fine sandy loam	SM, SC, ML, CL	A-2, A-4, A-6	0	85-100	80-100	55-100	30-90	16-35	NP-16
	10-49	Clay, silty clay, silty clay loam.	MH, CH	A-7	0	95-100	95-100	85-100	70-95	50-80	25-50
	49-73	Clay loam, silty clay loam, gravelly clay loam.	CL, GC, SC	A-6, A-7, A-2	0-5	50-100	45-100	40-100	30-95	30-50	11-25
23*: Fluvaquents.											
Udifluvents.											

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
24---------- Goldsboro	0-12	Sandy loam-------	SM, SM-SC, SC	A-2, A-4, A-6	0	90-100	75-100	50-95	15-45	<25	NP-14
	12-49	Sandy clay loam, sandy loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	60-95	25-55	16-37	4-18
	49-77	Sandy clay loam, clay loam, sandy clay.	SC, CL, CL-ML, CH	A-4, A-6, A-7-5	0	95-100	90-100	65-95	36-70	25-55	6-32
25B, 25C, 25D---- Kempsville	0-13	Gravelly sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2, A-4	0-2	65-80	50-75	20-60	15-45	<18	NP-7
	13-18	Gravelly sandy loam, gravelly fine sandy loam, gravelly loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-2	65-80	48-75	25-70	20-50	<22	NP-10
	18-44	Gravelly sandy clay loam, gravelly fine sandy loam, gravelly loam.	SC, CL, GC	A-2, A-6	0-2	65-80	48-75	30-65	20-55	25-40	10-20
	44-63	Stratified gravelly loamy sand to gravelly sandy clay loam.	GM, GM-GC, SM, SM-SC	A-1, A-2, A-4, A-6	0-5	45-80	35-75	20-55	15-40	<30	NP-15
26C, 26D, 26E---- LaRoque	0-7	Loam----------	ML, CL	A-4, A-6	0-5	80-100	75-100	75-100	60-90	<35	NP-15
	7-14	Loam, silt loam, clay loam.	CL, CL-ML	A-4, A-5, A-6, A-7	0-5	95-100	90-100	85-100	60-90	25-45	5-25
	14-34	Loam, silt loam, sandy loam.	SM, SC, ML	A-2, A-4, A-6	0-5	95-100	90-100	60-100	50-90	<35	NP-15
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
27C, 27D, 27E---- Louisburg	0-11	Sandy loam-------	SM, SM-SC	A-2	0-15	80-100	75-95	50-80	25-35	<30	NP-6
	11-27	Sandy loam-------	SM, SM-SC	A-2, A-4	0-15	85-100	75-98	53-78	25-40	<40	NP-7
	27-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
28B---------- Margo	0-9	Loam----------	ML, CL, CL-ML	A-4	0	98-100	90-100	85-100	60-90	<30	NP-10
	9-42	Loam, silt loam, silty clay loam.	CL-ML, CL	A-4, A-5, A-6, A-7	0	98-100	90-100	80-100	60-95	25-45	5-20
	42-45	Gravelly loam, gravelly silt loam, gravelly silty clay loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-5, A-7	0	55-80	50-95	40-70	30-65	25-50	5-25
	45-60	Sandy loam, loam, silty clay loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-5, A-7	0	98-100	90-100	60-100	30-90	20-45	5-20
29B, 29C2-------- Masada	0-14	Loam----------	ML, SM, SC, CL	A-4	0-5	90-100	75-100	60-85	35-70	<30	NP-8
	14-75	Clay loam, clay, gravelly clay.	MH, ML, CH, CL	A-7	0-10	80-100	70-100	65-90	50-80	45-65	20-35
30B---------- Mattaponi	0-8	Sandy loam-------	SM, SC, ML, CL	A-2, A-4, A-6	0	80-100	75-100	50-100	20-85	<35	NP-15
	8-44	Clay loam, sandy clay, clay.	CL, CH, SC	A-6, A-7	0	80-100	75-100	65-100	45-95	35-70	15-40
	44-68	Variable---------	---	---	---	---	---	---	---	---	---
31C2---------- Mattaponi	0-8	Sandy clay loam	SC, CL, ML	A-6, A-7	0	80-100	75-100	65-95	40-80	30-50	11-25
	8-44	Clay loam, sandy clay, clay.	CL, CH, SC	A-6, A-7	0	80-100	75-100	65-100	45-95	35-70	15-40
	44-68	Variable---------	---	---	---	---	---	---	---	---	---

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
32B, 32C2, 32D2--Nason	0-7	Silt loam--------	ML, CL-ML, SM	A-4	0-5	80-100	75-100	55-95	35-85	<38	NP-10
	7-11	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	11-35	Channery silt loam, silt loam.	CL-ML, SC, GM-GC	A-2, A-4, A-6	0-5	50-80	45-75	40-75	30-70	20-35	4-12
	35-69	Weathered bedrock	---	---	---	---	---	---	---	---	---
33B*, 33C2*: Orange----------	0-6	Loam----------	SM, ML, CL-ML, SM-SC	A-4	0	90-95	85-95	75-95	45-85	<24	NP-6
	6-43	Clay, silty clay, silty clay loam.	CH	A-7	0	90-95	85-95	75-95	65-90	50-80	25-50
	43-65	Silt loam, very channery silt loam, sandy clay loam.	SC, CL	A-6, A-7	0-40	70-100	50-100	45-100	40-90	25-45	10-25
Iredell---------	0-5	Loam----------	ML, CL-ML, CL	A-4, A-6	0-1	99-100	95-100	80-95	51-70	25-38	5-12
	5-30	Clay----------	CH	A-7	0	99-100	60-100	60-100	55-95	54-80	30-50
	30-62	Loam, sandy clay loam, clay loam.	CL, CH, SC	A-7	0-1	98-100	85-100	70-95	40-75	41-60	20-39
34B---------- Partlow	0-14	Sandy loam-------	SM, SC, ML, CL	A-2, A-4, A-6	0	85-100	80-100	50-95	25-75	<30	NP-15
	14-55	Sandy clay, sandy clay loam, clay loam.	SM, SC, ML, CL	A-2, A-4, A-5, A-6	0	85-100	80-100	50-100	25-80	20-50	5-25
	55-70	Sandy loam, loam, sandy clay loam.	SM, SC, ML, CL	A-2, A-4, A-6	0	85-100	80-100	50-95	25-75	15-40	NP-20
35C, 35D, 35E---- Poindexter	0-6	Loam----------	ML, CL-ML	A-4	0	90-100	85-100	85-100	55-90	<25	NP-7
	6-15	Clay loam, sandy clay loam, loam.	SC, CL	A-6	0	90-100	85-100	80-100	35-85	30-40	11-20
	15-27	Silty clay loam, loam, sandy loam.	SM, ML, CL-ML, SM-SC	A-2, A-4	0	90-100	85-100	55-95	30-70	<20	NP-5
	27-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
36A, 36B---------- Savannah	0-11	Sandy loam-------	ML, SM, SM-SC, CL-ML	A-2, A-4	0	80-100	75-100	45-85	20-55	<25	NP-6
	11-22	Sandy clay loam, clay loam, loam.	SC, CL, ML	A-2, A-6, A-7	0	80-100	75-100	60-95	30-80	30-45	10-25
	22-39	Loam, sandy clay loam, fine sandy loam.	SC, CL, SM-SC, ML	A-2, A-4, A-6	0	80-100	75-100	50-95	30-80	25-40	7-20
	39-79	Variable---------	---	---	---	---	---	---	---	---	---
37B, 37C---------- Spotsylvania	0-10	Fine sandy loam	ML, SM, SM-SC, CL-ML	A-2, A-4	0	85-95	80-95	55-90	30-65	<30	NP-10
	10-19	Clay loam, sandy clay loam, loam.	ML, CL, SM, SC	A-2, A-4, A-6, A-7	0-5	80-95	75-95	60-90	30-75	25-45	7-15
	19-54	Clay, clay loam	CH, MH, CL, ML	A-7	0-5	80-95	75-95	70-90	60-90	41-65	10-30
	54-74	Sandy clay loam, loam, sandy loam.	ML, SM, SC, CL	A-2, A-4, A-6	0-5	75-95	70-95	45-85	30-60	10-40	NP-20

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
38B---------- Suffolk	0-10	Sandy loam-------	SM, SM-SC, ML, CL-ML	A-2, A-4	0	95-100	90-100	50-80	25-60	<20	NP-7
	10-38	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-2, A-6	0	95-100	90-100	50-95	25-75	20-40	10-25
	38-60	Loamy fine sand, fine sandy loam, gravelly sand.	SP, SM, SM-SC	A-1, A-2, A-3, A-4	0	75-100	60-100	30-80	3-50	<18	NP-7
39B, 39C2, 39D2-- Tatum	0-8	Loam----------	ML, CL, SM	A-4	0	85-100	80-100	65-100	40-90	20-34	NP-10
	8-36	Silty clay loam, silty clay, clay.	MH	A-7	0	75-100	70-100	60-100	55-95	50-80	10-36
	36-77	Silt loam, loam, silty clay loam.	ML, CL	A-6, A-7	0	75-100	70-100	60-90	60-85	30-45	12-20
40---------- Tetotum Variant	0-8	Loam----------	ML, CL-ML, SM, SM-SC	A-4	0	95-100	90-100	65-99	35-60	<23	NP-7
	8-53	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	53-80	Variable---------	---	---	0	---	---	---	---	---	---
41---------- Toccoa	0-9	Sandy loam-------	SM, ML	A-2, A-4	0	98-100	95-100	85-100	25-60	<30	NP-4
	9-61	Sandy loam, loam	SM, ML	A-2, A-4	0	95-100	90-100	60-100	30-55	<30	NP-4
42B---------- Toddstav	0-7	Silt loam--------	ML, CL-ML, CL	A-4	0	98-100	95-100	85-100	60-90	<30	NP-10
	7-55	Loam, silt loam, clay loam.	CL, CL-ML, ML	A-4, A-5, A-6, A-7	0	98-100	95-100	85-100	60-90	20-45	5-20
	55-70	Loam, silt loam, sandy loam.	SM, SC, ML, CL	A-2, A-4, A-6	0	98-100	95-100	60-100	30-90	<35	NP-15
43B, 43C2-------- Turbeville	0-12	Loam----------	ML, SM, CL-ML	A-2, A-4	0-20	80-100	75-100	50-90	30-75	<28	NP-7
	12-65	Clay, clay loam, sandy clay.	CL, MH, CH	A-7	0-20	70-100	65-100	60-100	55-95	45-65	16-35
44*. Udorthents											
45B*: Udorthents.											
Udifluvents.											
46*: Urban land.											
Udults.											
47E---------- Watt	0-7	Channery silt loam.	CL-ML, ML, SM	A-4, A-6	10-20	80-90	50-80	45-75	40-60	15-35	NP-15
	7-16	Channery silt loam, channery silty clay loam.	SM-SC, CL, CL-ML	A-4, A-6	10-20	80-90	50-80	45-80	40-70	20-40	5-20
	16-32	Very channery silt loam, channery silt loam, channery loam.	GM, GM-GC, GC	A-2, A-4, A-6	15-40	60-80	30-55	25-50	20-45	15-35	NP-15
	32	Unweathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
48A, 48B--------- Wickham	0-10	Loam----------	SM, SM-SC, ML, CL-ML	A-4	0	95-100	90-100	70-100	45-80	<25	NP-7
	10-46	Sandy clay loam, clay loam, loam.	CL-ML, CL, SC, SM-SC	A-2, A-4 A-6, A-7-6	0	95-100	90-100	75-100	30-70	20-41	5-15
	46-67	Variable---------	---	---	---	---	---	---	---	---	---

*See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
1B----------	0-12	10-27	1.25-1.55	0.6-6.0	0.08-0.20	4.5-5.5	Low----------	0.28	4	.5-2
Abell	12-47	18-35	1.35-1.65	0.6-2.0	0.13-0.19	4.5-5.5	Low----------	0.28		
	47-62	30-50	1.35-1.65	0.6-2.0	0.11-0.17	4.5-5.5	Moderate-----	0.28		
	62-75	10-27	1.45-1.65	0.6-6.0	0.08-0.18	4.5-5.5	Low----------	0.28		
2B----------	0-11	10-24	1.30-1.50	2.0-6.0	0.12-0.20	4.5-6.0	Low----------	0.20	4	.5-3
Altavista	11-52	18-35	1.30-1.50	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.24		
	52-80	---	---	---	---	---	----------	----		
3B----------	0-9	5-20	1.40-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.24	4	.5-2
Appling	9-39	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.20		
	39-47	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24		
	47-80	---	---	---	---	---	----------	----		
4C2*, 4D2*:										
Appling---------	0-9	5-20	1.40-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.24	4	.5-2
	9-39	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.20		
	39-47	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24		
	47-80	---	---	---	---	---	----------	----		
Wedowee---------	0-6	6-20	1.20-1.40	2.0-6.0	0.10-0.18	4.5-5.5	Low----------	0.24	2	.5-1
	6-10	14-30	1.30-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.28		
	10-33	35-45	1.30-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	33-75	---	---	---	---	---	----------	----		
5*, 6*.										
Aquults										
7B*:										
Aquults.										
Margo----------	0-9	5-27	1.10-1.40	2.0-6.0	0.16-0.20	4.5-5.5	Low----------	0.37	3	1-3
	9-42	18-35	1.20-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Moderate-----	0.32		
	42-45	5-40	1.20-1.60	0.6-2.0	0.08-0.15	4.5-5.5	Moderate-----	0.28		
	45-60	5-40	1.15-1.45	0.6-2.0	0.14-0.16	4.5-5.5	Moderate-----	0.32		
8B, 8C----------	0-14	7-22	1.45-1.55	0.6-6.0	0.08-0.15	4.5-6.0	Low----------	0.24	5	.5-1
Bama	14-68	18-32	1.30-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.32		
	68-86	20-35	1.30-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.32		
9B----------	0-9	10-27	1.20-1.50	0.6-6.0	0.14-0.20	4.5-5.5	Low----------	0.32	4	1-3
Brockroad	9-59	35-70	1.30-1.60	0.6-2.0	0.10-0.14	4.5-5.5	Moderate-----	0.32		
	59-75	20-55	1.30-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Moderate-----	0.24		
	75-80	WB	---	---	---	---	----------	----		
10----------	0-11	5-19	1.25-1.50	6.0-20	0.06-0.10	5.1-6.5	Low----------	0.24	5	1-2
Cartecay	11-52	8-18	1.30-1.50	2.0-6.0	0.09-0.12	5.1-6.5	Low----------	0.24		
	52-88	2-16	1.30-1.55	6.0-20	0.06-0.09	5.1-6.5	Low----------	0.15		
11B----------	0-9	18-30	1.25-1.55	0.6-6.0	0.15-0.22	4.5-6.0	Low----------	0.32	4	.5-3
Catharpin	9-54	35-75	1.35-1.60	0.6-2.0	0.16-0.20	4.5-5.5	Moderate-----	0.32		
	54-76	30-70	1.30-1.60	0.6-2.0	0.14-0.19	4.5-5.5	Moderate-----	0.32		
	76-99	15-60	1.30-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Moderate-----	0.24		
12B----------	0-13	5-20	1.00-1.50	2.0-6.0	0.12-0.14	4.5-6.0	Low----------	0.28	3	.5-2
Cecil	13-46	40-60	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	46-74	---	---	---	---	---	----------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
13C2*, 13D2*:										
Cecil----------	0-13	5-20	1.00-1.50	2.0-6.0	0.12-0.14	4.5-6.0	Low----------	0.28	3	.5-2
	13-46	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-6.0	Low----------	0.28		
	46-74	40-60	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
Pacolet---------	0-7	20-35	1.30-1.50	0.6-2.0	0.10-0.14	4.5-6.5	Low----------	0.24	2	.5-1
	7-27	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28		
	27-64	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
14B, 14C---------	0-7	7-25	1.20-1.50	0.6-6.0	0.10-0.18	4.5-5.5	Low----------	0.37	4	1-3
Colfax	7-25	20-35	1.25-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Moderate-----	0.37		
	25-37	15-30	1.65-1.80	0.06-0.2	0.06-0.10	4.5-5.5	Low----------	0.28		
	37-60	5-20	1.30-1.55	0.6-2.0	0.05-0.10	4.5-5.5	Low----------	0.28		
15B2, 15C2, 15D2-	0-8	15-27	1.20-1.50	2.0-6.0	0.14-0.19	5.1-6.0	Low----------	0.37	4	1-3
Cullen	8-38	35-70	1.30-1.60	0.6-2.0	0.10-0.14	5.1-6.0	Moderate-----	0.24		
	38-67	20-50	1.30-1.50	0.6-2.0	0.14-0.19	5.1-6.0	Moderate-----	0.24		
16----------	0-10	5-15	1.30-1.45	0.6-2.0	0.14-0.20	3.6-5.5	Low----------	0.37	4	.5-1
Dogue	10-53	35-50	1.45-1.60	0.2-0.6	0.12-0.19	3.6-5.5	Moderate-----	0.28		
	53-65	5-30	1.30-1.50	0.6-6.0	0.05-0.14	3.6-5.5	Low----------	0.17		
17C*, 17D*, 17E*:										
Dystrochrepts.										
Udults.										
18B, 18C---------	0-9	7-18	1.30-1.40	2.0-6.0	0.10-0.17	4.5-5.5	Low----------	0.28	4	.5-3
Emporia	9-59	18-35	1.35-1.45	0.2-2.0	0.10-0.18	4.5-5.5	Low----------	0.28		
	59-72	21-35	1.45-1.60	0.06-0.6	0.10-0.16	4.5-5.5	Low----------	0.20		
19B----------	0-10	2-10	1.30-1.55	6.0-20	0.06-0.09	4.5-5.5	Low----------	0.28	5	.5-1
Faceville	10-87	35-55	1.20-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.37		
20B*, 20C2*:										
Faceville-------	0-10	2-10	1.30-1.55	6.0-20	0.06-0.09	4.5-5.5	Low----------	0.28	5	.5-1
	10-87	35-55	1.20-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.37		
Marlboro--------	0-15	5-20	1.30-1.60	2.0-6.0	0.09-0.14	5.1-6.5	Low----------	0.20	5	.5-2
	15-60	35-65	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Low----------	0.20		
	60-72	30-60	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.20		
21B*, 21C2*:										
Faceville-------	0-10	2-10	1.30-1.55	6.0-20	0.06-0.09	4.5-5.5	Low----------	0.28	5	.5-1
	10-87	35-55	1.20-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.37		
Varina----------	0-13	8-18	1.40-1.60	2.0-6.0	0.08-0.13	4.5-6.5	Low----------	0.17	4	.5-2
	13-31	35-60	1.30-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.28		
	31-89	30-55	1.30-1.50	0.06-0.2	0.06-0.09	4.5-5.5	Low----------	0.28		
22B, 22C2, 22D2--	0-10	5-27	1.25-1.55	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.37	4	1-3
Fluvanna	10-49	35-65	1.30-1.60	0.06-0.6	0.10-0.17	4.5-5.5	Moderate-----	0.28		
	49-73	20-40	1.30-1.60	0.06-0.6	0.05-0.09	4.5-5.5	Moderate-----	0.28		
23*:										
Fluvaquents.										
Udifluvents.										
24----------	0-12	5-15	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.20	5	.5-2
Goldsboro	12-49	18-30	1.30-1.50	0.6-2.0	0.11-0.15	4.5-5.5	Low----------	0.24		
	49-77	20-45	1.30-1.40	0.6-2.0	0.11-0.15	4.5-5.5	Low----------	0.24		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
25B, 25C, 25D----	0-13	5-18	1.30-1.45	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.24	4	.5-2
Kempsville	13-18	12-24	1.30-1.50	2.0-6.0	0.08-0.12	4.5-5.5	Low----------	0.24		
	18-44	18-35	1.35-1.70	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.24		
	44-63	5-30	1.30-1.65	0.6-2.0	0.05-0.10	4.5-5.5	Low----------	0.24		
26C, 26D, 26E----	0-7	5-27	1.10-1.40	2.0-6.0	0.13-0.20	3.6-5.5	Low----------	0.37	4	1-3
LaRoque	7-14	18-35	1.30-1.60	0.6-2.0	0.11-0.20	3.6-5.5	Low----------	0.32		
	14-34	5-27	1.20-1.50	2.0-6.0	0.11-0.20	3.6-5.5	Low----------	0.28		
	34-60	---	---	---	---	---	----------	----		
27C, 27D, 27E----	0-11	5-20	1.20-1.45	6.0-20	0.09-0.12	4.5-6.0	Low----------	0.24	2	.5-2
Louisburg	11-27	20-30	1.30-1.50	6.0-20	0.10-0.12	4.5-6.0	Low----------	0.24		
	27-36	---	---	---	---	---	----------	----		
28B----------	0-9	5-27	1.10-1.40	2.0-6.0	0.16-0.20	4.5-5.5	Low----------	0.37	3	1-3
Margo	9-42	18-35	1.20-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Moderate-----	0.32		
	42-45	5-40	1.20-1.60	0.6-2.0	0.08-0.15	4.5-5.5	Moderate-----	0.28		
	45-60	5-40	1.15-1.45	0.6-2.0	0.14-0.16	4.5-5.5	Moderate-----	0.32		
29B, 29C2--------	0-14	5-20	1.20-1.50	2.0-6.0	0.10-0.17	4.5-5.5	Low----------	0.32	4	1-3
Masada	14-75	35-55	1.30-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Moderate-----	0.24		
30B----------	0-8	5-27	1.25-1.55	0.6-6.0	0.08-0.20	4.5-5.5	Low----------	0.35	3	1-3
Mattaponi	8-44	35-65	1.40-1.70	0.2-0.6	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	44-68	---	---	---	---	---	----------	----		
31C2----------	0-8	20-40	1.45-1.75	0.2-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.32	2	.5-2
Mattaponi	8-44	35-65	1.40-1.70	0.2-0.6	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	44-68	---	---	---	---	---	----------	----		
32B, 32C2, 32D2--	0-7	10-25	1.25-1.55	0.6-2.0	0.14-0.20	4.5-6.5	Low----------	0.37	4	1-3
Nason	7-11	35-50	1.30-1.60	0.6-2.0	0.12-0.19	4.5-5.5	Moderate-----	0.28		
	11-35	10-25	1.25-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.28		
	35-69	---	---	---	---	---	----------	----		
33B*, 33C2*:										
Orange----------	0-6	10-25	1.25-1.55	0.6-2.0	0.14-0.20	5.1-6.5	Low----------	0.49	3	1-3
	6-43	35-60	1.35-1.65	0.06-0.2	0.10-0.19	5.1-6.5	High---------	0.28		
	43-65	10-35	1.35-1.65	0.2-0.6	0.13-0.20	5.6-7.8	Low----------	0.28		
Iredell---------	0-5	15-35	1.20-1.40	0.6-2.0	0.14-0.17	5.6-7.3	Low----------	0.32	3	.5-2
	5-30	40-60	1.20-1.50	0.06-0.2	0.16-0.22	6.1-7.3	Very high----	0.20		
	30-62	15-35	1.30-1.60	0.06-0.6	0.14-0.18	6.1-7.8	High---------	0.28		
34B----------	0-14	5-27	1.20-1.50	2.0-6.0	0.08-0.17	4.5-5.5	Low----------	0.28	4	1-3
Partlow	14-55	18-35	1.30-1.60	0.06-2.0	0.08-0.19	4.5-5.5	Moderate-----	0.28		
	55-70	5-35	1.30-1.60	2.0-6.0	0.08-0.17	4.5-5.5	Low----------	0.28		
35C, 35D, 35E----	0-6	10-25	1.25-1.55	2.0-6.0	0.12-0.20	5.1-7.3	Low----------	0.37	3	.5-2
Poindexter	6-15	20-35	1.35-1.65	0.6-2.0	0.13-0.19	5.1-7.3	Low----------	0.24		
	15-27	10-35	1.30-1.60	2.0-6.0	0.08-0.15	5.1-7.3	Low----------	0.24		
	27-45	---	---	---	---	---	----------	----		
36A, 36B----------	0-11	5-20	1.30-1.50	2.0-6.0	0.10-0.15	4.5-6.5	Low----------	0.28	3	1-3
Savannah	11-22	20-35	1.40-1.60	0.6-2.0	0.11-0.16	3.6-5.5	Low----------	0.37		
	22-39	15-35	1.70-1.90	<0.2	0.08-0.12	3.6-5.5	Low----------	0.37		
	39-79	---	---	---	---	---	----------	----		
37B, 37C----------	0-10	5-27	1.20-1.50	0.6-6.0	0.08-0.20	4.5-6.0	Low----------	0.32	4	.5-2
Spotsylvania	10-19	20-40	1.25-1.50	0.6-2.0	0.13-0.19	4.5-5.5	Low----------	0.32		
	19-54	35-55	1.30-1.60	0.6-2.0	0.12-0.19	4.5-5.5	Moderate-----	0.32		
	54-74	10-35	1.30-1.55	0.6-2.0	0.08-0.16	4.5-5.5	Low----------	0.32		
38B----------	0-10	6-18	1.35-1.45	2.0-6.0	0.12-0.15	3.6-5.5	Low----------	0.28	4	.5-2
Suffolk	10-38	10-33	1.40-1.50	0.6-2.0	0.12-0.20	3.6-5.5	Low----------	0.28		
	38-60	4-10	1.40-1.50	2.0-20	0.04-0.10	3.6-6.0	Low----------	0.17		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
39B, 39C2, 39D2-- Tatum	0-8 8-36 36-77	12-27 45-60 20-40	1.10-1.40 1.40-1.60 1.40-1.60	0.6-2.0 0.6-2.0 0.6-2.0	0.14-0.20 0.10-0.19 0.12-0.18	4.5-5.5 4.5-5.5 4.5-5.5	Low Moderate Low	0.37 0.28 0.28	4	.5-2
40 Tetotum Variant	0-8 8-53 53-80	10-24 18-35 ---	1.30-1.50 1.30-1.50 ---	2.0-6.0 0.6-2.0 ---	0.12-0.20 0.12-0.20 ---	4.5-6.0 4.5-6.0 ---	Low Low ---	0.20 0.24 ---	4	.5-3
41 Toccoa	0-9 9-61	3-17 2-19	1.30-1.50 1.30-1.50	2.0-6.0 2.0-6.0	0.09-0.12 0.09-0.12	5.1-6.5 5.1-6.5	Low Low	0.10 0.10	4	2-3
42B Toddstav	0-7 7-55 55-70	7-20 18-35 7-27	1.30-1.55 1.30-1.55 1.30-1.55	0.6-2.0 0.06-0.6 0.6-2.0	0.14-0.20 0.14-0.20 0.08-0.20	3.6-5.5 3.6-5.5 3.6-5.5	Low Moderate Low	0.32 0.28 0.28	4	1-3
43B, 43C2 Turbeville	0-12 12-65	10-25 30-60	1.20-1.55 1.30-1.50	2.0-6.0 0.6-2.0	0.10-0.17 0.13-0.16	4.5-5.5 4.5-5.5	Low Moderate	0.32 0.24	5	.5-2
44*. Udorthents										
45B*: Udorthents. Udifluvents.										
46*: Urban land. Udults.										
47E Watt	0-7 7-16 16-32 32	10-27 18-32 5-27 ---	1.30-1.60 1.35-1.65 1.35-1.65 ---	2.0-6.0 2.0-6.0 2.0-6.0 ---	0.08-0.12 0.08-0.12 0.04-0.08 ---	4.0-5.5 4.0-5.5 4.0-5.5 ---	Low Low Low ---	0.32 0.24 0.24 ---	3	.5-2
48A, 48B Wickham	0-10 10-46 46-67	8-15 18-25 ---	1.45-1.65 1.30-1.40 ---	2.0-6.0 0.6-2.0 ---	0.11-0.16 0.12-0.17 ---	4.5-6.0 4.5-6.0 ---	Low Low ---	0.20 0.24 ---	5	.5-2

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
1B---------- Abell	B	None--------	---	---	2.0-3.5	Apparent	Dec-Mar	>60	---	Moderate	High.
2B---------- Altavista	C	Occasional	Very brief	Mar-Jul	1.5-2.5	Apparent	Dec-Mar	>60	---	Moderate	Moderate.
3B---------- Appling	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
4C2*, 4D2*:											
Appling----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Wedowee----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
5*, 6*. Aquults											
7B*: Aquults.											
Margo----------	B	Frequent----	Very brief	Jan-Dec	1.0-3.0	Apparent	Nov-Mar	>60	---	Moderate	High.
8B, 8C---------- Bama	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
9B---------- Brockroad	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
10---------- Cartecay	C	Frequent----	Brief-----	Dec-Mar	0.5-1.5	Apparent	Jan-Apr	>60	---	Low------	Moderate.
11B---------- Catharpin	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
12B---------- Cecil	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
13C2*, 13D2*:											
Cecil----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Pacolet----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
14B, 14C---------- Colfax	C	None--------	---	---	0.5-1.5	Perched	Nov-Jun	>60	---	High-----	High.
15B2, 15C2, 15D2-- Cullen	C	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
16---------- Dogue	C	None--------	---	---	1.5-3.0	Apparent	Jan-Mar	>60	---	High-----	High.
17C*, 17D*, 17E*: Dystrochrepts.											
Udults.											
18B, 18C---------- Emporia	C	None--------	---	---	3.0-4.5	Perched	Nov-Apr	>60	---	Moderate	High.
19B---------- Faceville	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.

See footnotes at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
20B*, 20C2*: Faceville	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
Marlboro	B	None	---	---	>6.0	---	---	>60	---	High	High.
21B*, 21C2*: Faceville	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
Varina	C	None	---	---	4.0-5.0	Perched	Dec-Apr	>60	---	Moderate	High.
22B, 22C2, 22D2--- Fluvanna	C	None	---	---	>6.0	---	---	>60	---	High	High.
23*: Fluvaquents. Udifluvents.											
24--- Goldsboro	B	None	---	---	2.0-3.0	Apparent	Dec-Apr	>60	---	Moderate	High.
25B, 25C, 25D----- Kempsville	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
26C, 26D, 26E----- LaRoque	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
27C, 27D, 27E----- Louisburg	B	None	---	---	>6.0	---	---	>48	Hard	Low	Moderate.
28B--- Margo	B	Frequent	Very brief	Jan-Dec	1.0-3.0	Apparent	Nov-Mar	>60	---	Moderate	High.
29B, 29C2--- Masada	C	None	---	---	>6.0	---	---	>60	---	High	High.
30B, 31C2--- Mattaponi	C	None	---	---	3.0-6.0	Perched	Dec-Mar	>60	---	High	High.
32B, 32C2, 32D2--- Nason	C	None	---	---	>6.0	---	---	40-60	Soft	Moderate	High.
33B*, 33C2*: Orange	D	None	---	---	1.0-3.0	Apparent	Dec-May	>40	Hard	High	Moderate.
Iredell	D	None	---	---	1.0-2.0	Perched	Dec-Apr	>40	Soft	High	Low.
34B**--- Partlow	D	Frequent	Brief	Jan-Dec	+1-1.0	Apparent	Nov-May	>60	---	High	High.
35C, 35D, 35E----- Poindexter	B	None	---	---	>6.0	---	---	40-60	Hard	Moderate	Moderate.
36A, 36B--- Savannah	C	None	---	---	1.5-2.5	Perched	Dec-May	>60	---	High	High.
37B, 37C--- Spotsylvania	C	None	---	---	>6.0	---	---	>60	---	High	High.
38B--- Suffolk	B	None to rare	---	---	>6.0	---	---	>60	---	Moderate	High.
39B, 39C2, 39D2--- Tatum	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
40--- Tetotum Variant	C	Occasional	Very brief	Mar-Jul	1.5-2.5	Apparent	Dec-Mar	>60	---	Moderate	Moderate.
41--- Toccoa	B	Frequent	Brief	Jan-Dec	2.5-5.0	Apparent	Dec-Apr	>60	---	Low	Moderate.

See footnotes at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
42B**---------- Toddstav	D	Frequent----	Brief-----	Jan-Dec	+1-1.0	Apparent	Nov-May	>60	---	High-----	High.
43B, 43C2---------- Turbeville	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
44*. Udorthents											
45B*: Udorthents.											
Udifluvents.											
46*: Urban land.											
Udults.											
47E---------- Watt	D	None--------	---	---	>6.0	---	---	20-40	Soft	High-----	High.
48A, 48B---------- Wickham	B	None to rare	---	---	>6.0	---	---	>60	---	Moderate	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

** In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Abell	Fine-loamy, mixed, thermic Aquic Hapludults
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Appling	Clayey, kaolinitic, thermic Typic Hapludults
Bama	Fine-loamy, siliceous, thermic Typic Paleudults
Brockroad	Clayey, mixed, thermic Typic Hapludults
Cartecay	Coarse-loamy, mixed, nonacid, thermic Aquic Udifluvents
Catharpin	Clayey, mixed, thermic Typic Hapludults
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Colfax	Fine-loamy, mixed, thermic Aquic Fragiudults
Cullen	Clayey, mixed, thermic Typic Hapludults
Dogue	Clayey, mixed, thermic Aquic Hapludults
Emporia	Fine-loamy, siliceous, thermic Typic Hapludults
Faceville	Clayey, kaolinitic, thermic Typic Paleudults
Fluvanna	Clayey, mixed, thermic Typic Hapludults
Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
Iredell	Fine, montmorillonitic, thermic Typic Hapludalfs
*Kempsville	Fine-loamy, siliceous, thermic Typic Hapludults
LaRoque	Fine-loamy, mixed, thermic Ochreptic Hapludults
*Louisburg	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Margo	Fine-silty, mixed, thermic Aquic Hapludults
Marlboro	Clayey, kaolinitic, thermic Typic Paleudults
Masada	Clayey, mixed, thermic Typic Hapludults
Mattaponi	Clayey, mixed, thermic Typic Hapludults
Nason	Clayey, mixed, thermic Typic Hapludults
Orange	Fine, montmorillonitic, thermic Albaquic Hapludalfs
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
Partlow	Fine-loamy, mixed, thermic Typic Ochraquults
Poindexter	Fine-loamy, mixed, thermic Typic Hapludalfs
Savannah	Fine-loamy, siliceous, thermic Typic Fragiudults
Spotsylvania	Clayey, kaolinitic, thermic Typic Hapludults
Suffolk	Fine-loamy, siliceous, thermic Typic Hapludults
Tatum	Clayey, mixed, thermic Typic Hapludults
Tetotum Variant	Fine-loamy, mixed, thermic Aquic Hapludults
Toccoa	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Toddstav	Fine-silty, mixed, thermic Typic Ochraquults
Turbeville	Clayey, mixed, thermic Typic Paleudults
Varina	Clayey, kaolinitic, thermic Plinthic Paleudults
Watt	Loamy-skeletal, mixed, mesic Umbric Dystrochrepts
Wedowee	Clayey, kaolinitic, thermic Typic Hapludults
Wickham	Fine-loamy, mixed, thermic Typic Hapludults

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

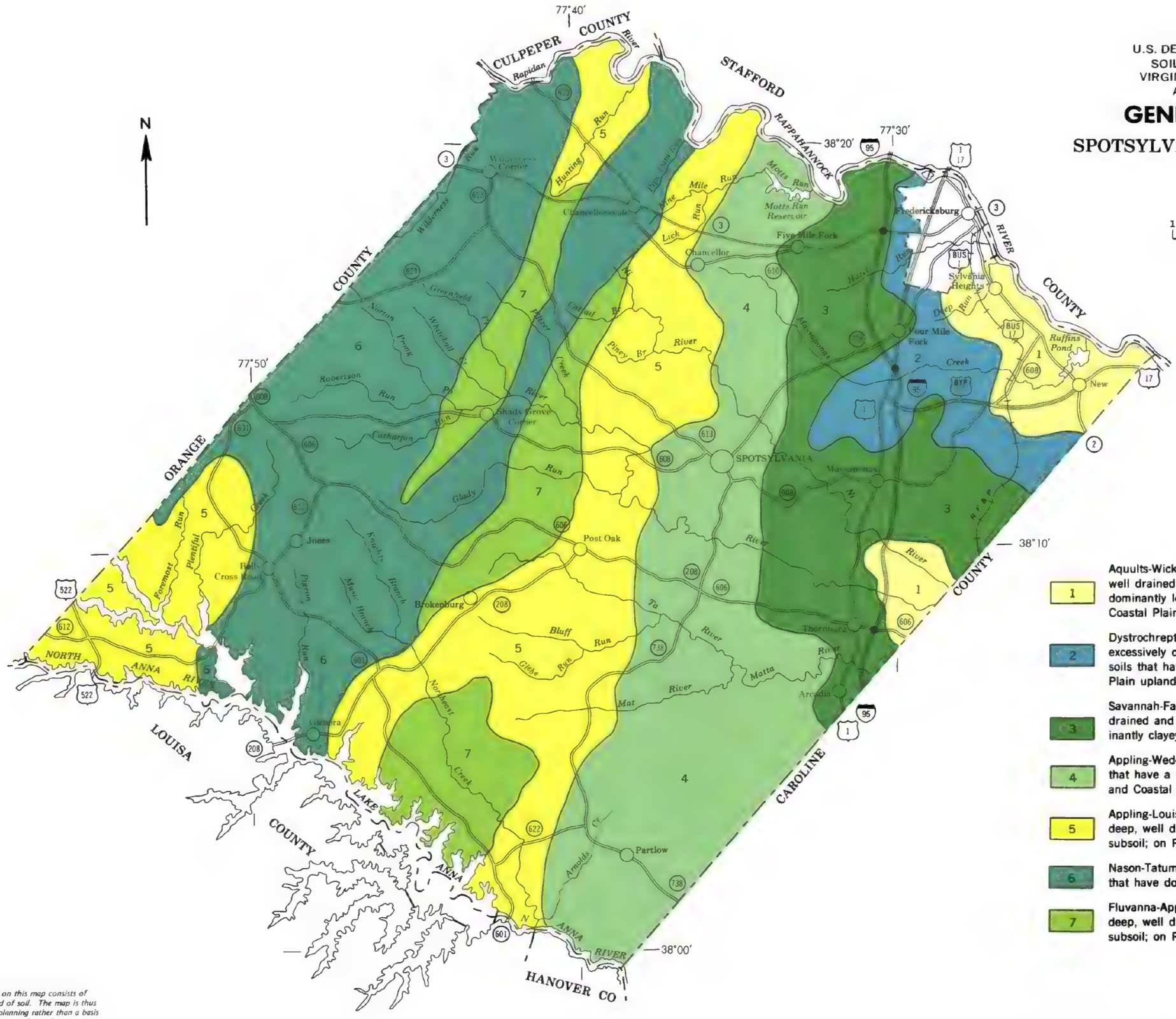
GENERAL SOIL MAP

SPOTSYLVANIA COUNTY, VIRGINIA

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km



LEGEND

1 — Aquults-Wickham-Altavista association: Deep, poorly drained, well drained, and moderately well drained soils that have a dominantly loamy or clayey subsoil; on stream terraces and Coastal Plain terraces

2 — Dystrochrepts-Kempsville-Udults association: Deep, somewhat excessively drained, well drained, and moderately well drained soils that have a dominantly loamy or clayey subsoil; on Coastal Plain uplands

3 — Savannah-Faceville-Varina association: Deep, moderately well drained and well drained soils that have a fragipan or a dominantly clayey subsoil; on Coastal Plain uplands

4 — Appling-Wedowee-Emporia association: Deep, well drained soils that have a dominantly clayey or loamy subsoil; on Piedmont and Coastal Plain uplands

5 — Appling-Louisburg-Wedowee association: Deep and moderately deep, well drained soils that have a dominantly clayey or loamy subsoil; on Piedmont uplands

6 — Nason-Tatum-Catharpin association: Deep, well drained soils that have dominantly clayey subsoil; on Piedmont uplands

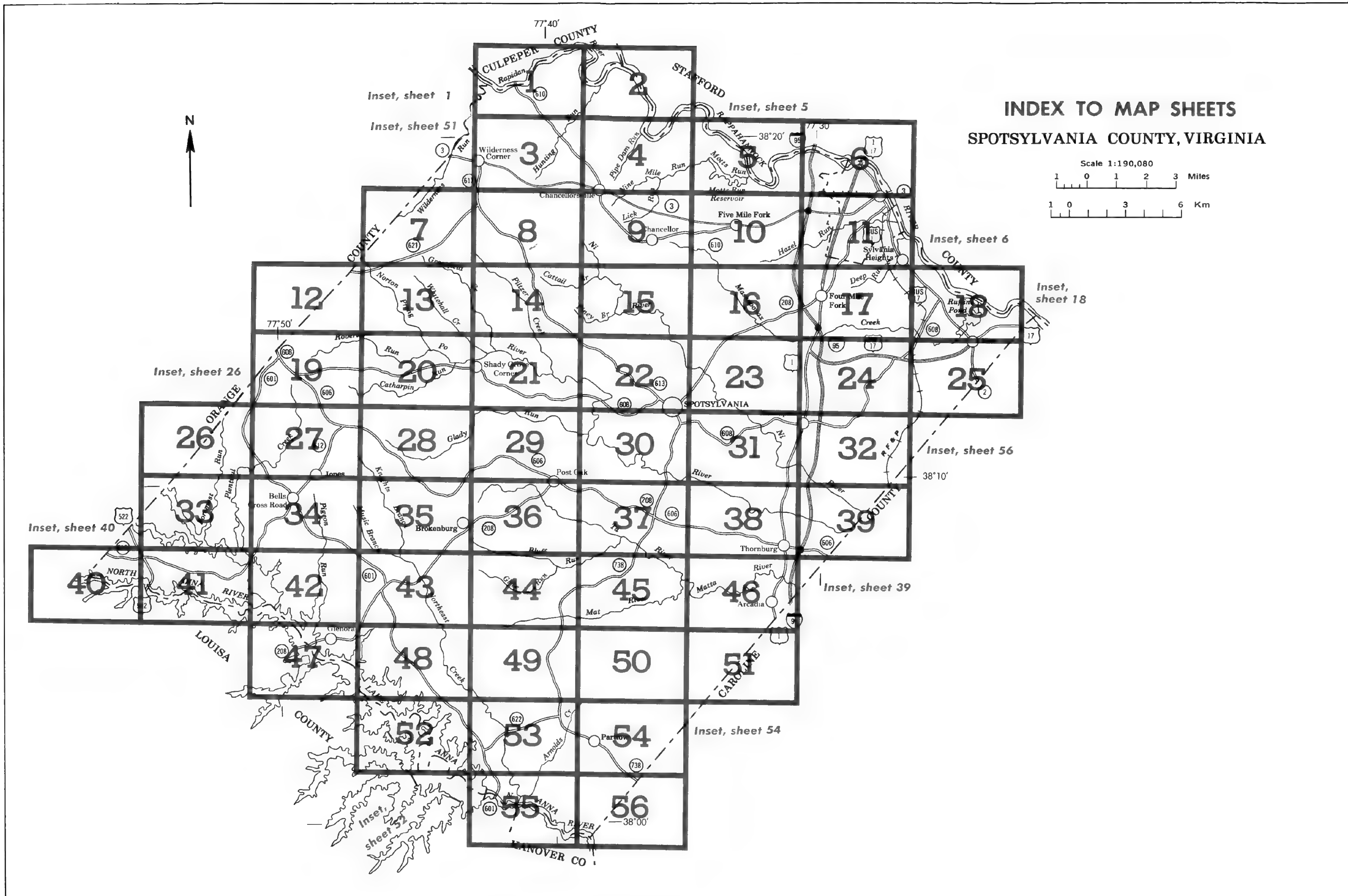
7 — Fluvanna-Appling-Poindexter association: Deep and moderately deep, well drained soils that have a dominantly clayey or loamy subsoil; on Piedmont uplands

Compiled 1982

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

INDEX TO MAP SHEETS

SPOTSYLVANIA COUNTY, VIRGINIA



SOIL LEGEND

Publication symbols consists of numbers or a combination of numbers and letters (e.g., 5, 38B, or 27E). A capital letter of A, B, C, D, or E, following a number indicates the class of slope. Symbols without a slope letter are for nearly level soils, or miscellaneous areas.

SYMBOL	NAME
1B	Abell sandy loam, 2 to 7 percent slopes
2B	Altavista sandy loam, 0 to 4 percent slopes
3B	Appling sandy loam, 2 to 7 percent slopes
4C2	Appling-Wedowee sandy loams, 7 to 15 percent slopes, eroded
4D2	Appling-Wedowee sandy loams, 15 to 25 percent slopes, eroded
5	Aquults, clayey subsoil
6	Aquults, gravelly substratum
7B	Aquults, loamy-Margo complex, 2 to 7 percent slopes
8B	Barna sandy loam, 2 to 7 percent slopes
8C	Barna sandy loam, 7 to 15 percent slopes
9B	Brockroad silt loam, 2 to 7 percent slopes
10	Cartecay sandy loam
11B	Catharpin silt loam, 2 to 7 percent slopes
12B	Cecil loam, 2 to 7 percent slopes
13C2	Cecil-Pacolet complex, 7 to 15 percent slopes, eroded
13D2	Cecil-Pacolet complex, 15 to 25 percent slopes, eroded
14B	Colfax sandy loam, 2 to 7 percent slopes
14C	Colfax sandy loam, 7 to 15 percent slopes
15B2	Cullen loam, 2 to 7 percent slopes, eroded
15C2	Cullen loam, 7 to 15 percent slopes, eroded
15D2	Cullen loam, 15 to 25 percent slopes eroded
16	Dogue loam
17C	Dystrochrepts-Udults complex, sloping
17D	Dystrochrepts-Udults complex, moderately steep
17E	Dystrochrepts-Udults complex, steep
18B	Emporia sandy loam, 2 to 7 percent slopes
18C	Emporia sandy loam, 7 to 15 percent slopes
19B	Faceville loam, 2 to 7 percent slopes
20B	Faceville-Marlboro complex, 2 to 7 percent slopes
20C2	Faceville-Marlboro complex, 7 to 15 percent slopes, eroded
21B	Faceville-Varina complex, 2 to 7 percent slopes
21C2	Faceville-Varina complex, 7 to 15 percent slopes, eroded
22B	Fluvanna fine sandy loam, 2 to 7 percent slopes
22C2	Fluvanna fine sandy loam, 7 to 15 percent slopes, eroded
22D2	Fluvanna fine sandy loam, 15 to 25 percent slopes, eroded
23	Fluvaquents- Udifluvents complex
24	Goldsboro sandy loam
25B	Kempsville gravelly sandy loam, 2 to 7 percent slopes
25C	Kempsville gravelly sandy loam, 7 to 15 percent slopes
25D	Kempsville gravelly sandy loam, 15 to 25 percent slopes
26C	LaRoque loam, 7 to 15 percent slopes
26D	LaRoque loam, 15 to 25 percent slopes
26E	LaRoque loam, 25 to 55 percent slopes
27C	Louisburg sandy loam, 7 to 15 percent slopes
27D	Louisburg sandy loam, 15 to 25 percent slopes
27E	Louisburg sandy loam, 25 to 50 percent slopes
28B	Margo loam, 2 to 7 percent slopes
29B	Masada loam, 2 to 7 percent slopes
29C2	Masada loam, 7 to 15 percent slopes, eroded
30B	Mattaponi sandy loam, 2 to 7 percent slopes
31C2	Mattaponi sandy clay loam, 7 to 15 percent slopes, eroded
32B	Nason silt loam, 2 to 7 percent slopes
32C2	Nason silt loam, 7 to 15 percent slopes, eroded
32D2	Nason silt loam, 15 to 25 percent slopes, eroded
33B	Orange-Iredell loams, 2 to 7 percent slopes
33C2	Orange-Iredell loams, 7 to 15 percent slopes, eroded
34B	Partlow sandy loam, 0 to 7 percent slopes
35C	Poindexter loam, 7 to 15 percent slopes
35D	Poindexter loam, 15 to 25 percent slopes
35E	Poindexter loam, 25 to 60 percent slopes
36A	Savannah sandy loam, 0 to 2 percent slopes
36B	Savannah sandy loam, 2 to 7 percent slopes
37B	Spotsylvania fine sandy loam, 2 to 7 percent slopes
37C	Spotsylvania fine sandy loam, 7 to 15 percent slopes
38B	Suffolk sandy loam, 2 to 7 percent slopes
39B	Tatum loam, 2 to 7 percent slopes
39C2	Tatum loam, 7 to 15 percent slopes, eroded
39D2	Tatum loam, 15 to 25 percent slopes, eroded
40	Tetotum Variant loam
41	Toccoa loamy sand
42B	Toddsev silt loam, 0 to 4 percent slopes
43B	Turbeville loam, 2 to 7 percent slopes
43C2	Turbeville loam, 7 to 15 percent slopes, eroded
44	Udorthents, gravelly
45B	Udorthents- Udifluvents complex, gently sloping
46	Urban land-Udults complex, smoothed
47E	Watt channery silt loam, 15 to 35 percent slopes
48A	Wickham loam, 0 to 2 percent slopes
48B	Wickham loam, 2 to 7 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline
- AD HOC BOUNDARY (label) — Hedley Airstrip
- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE
- STATE COORDINATE TICK
- LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1203

- RAILROAD
- POWER TRANSMISSION LINE (normally not shown)
- PIPE LINE (normally not shown)
- FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

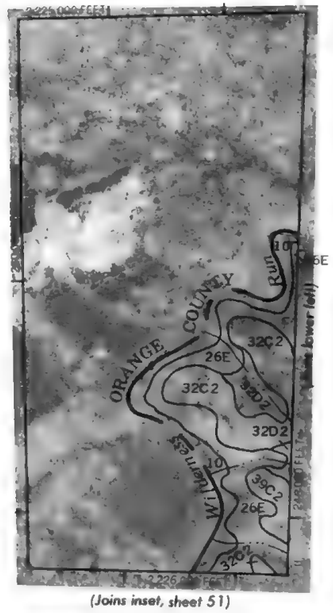
- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

- SOIL DELINEATIONS AND SYMBOLS — 9B, 4D2
- ESCARPMENTS
  - Bedrock (points down slope)
  - Other than bedrock (points down slope)
- SHORT STEEP SLOPE
- GULLY
- DEPRESSION OR SINK
- SOIL SAMPLE SITE (normally not shown)
- MISCELLANEOUS
  - Blowout
  - Clay spot
  - Gravelly spot
  - Gumbo, slick or scabby spot (sodic)
  - Dumps and other similar non soil areas
  - Prominent hill or peak
  - Rock outcrop (includes sandstone and shale)
  - Saline spot
  - Sandy spot
  - Severely eroded spot
  - Slide or slip (tips point upslope)
  - Stony spot, very stony spot

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 1

SPOTSYLVANIA COUNTY, VIRGINIA NO. 1



(Joins inset, sheet 51)

1000 AND 2000-FOOT GRID TICKS

N

1 Mile

5 000 Feet

Scale 1:15 840

0 0 1 000 ¼ 2 000 ½ 3 000 ¾ 4 000 1 5 000

N

1 Mile
5 000 Feet
Scale 1:15 840

SPOTSYLVANIA COUNTY, VIRGINIA NO. 2

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 3

SPOTSYLVANIA COUNTY, VIRGINIA NO. 3

3

N

1 Mile

5 000 Feet

Scale 1:15 840

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 4

(4)

N

1 Mile

5 000 Feet

Scale 1:15 840

SPOTSYLVANIA COUNTY, VIRGINIA NO. 4

SPOTSYLVANIA COUNTY, VIRGINIA NO. 5

2 265 000 FEET (Joins lower right)

4 900 000 FEET

(Joins sheet 4)

(Joins sheet 6)

(Joins sheet 10)

2 280 000 FEET

2 265 000 FEET

250000 FEET

(Joins lower left)

43C2 (Joins upper left)

2000 AND 3000-FOOT GRID TICKS

STAFFORD

RAPPAHANNOCK COUNTY

RIVER

Motts Run Reservoir

Bitzner Meadow

Embrey Hill

Nimenitel Run

Motts Run

Turkey Run

N

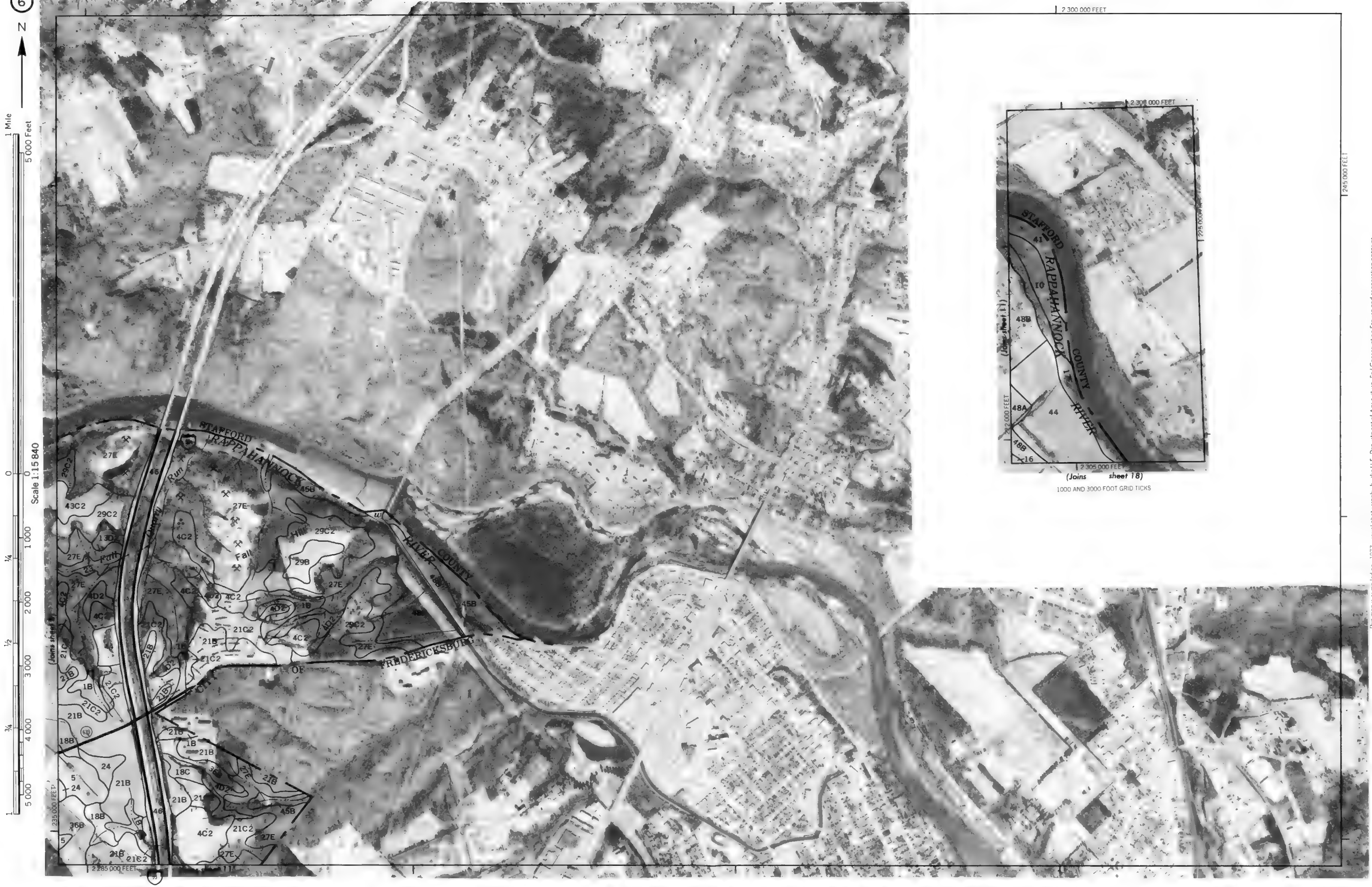
1 Mile

5 000 Feet

Scale 1:15 840

1 0 1 2 3 4 5 Miles

1 0 1 2 3 4 5 Kilometers



This map is compiled on 1977 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SPOTSYLVANIA COUNTY, VIRGINIA NO. 6

SPOTSYLVANIA COUNTY, VIRGINIA NO. 7

This map is compiled on 1977 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and [illegible] shown are approximately positioned.

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 8

8

N

1 Mile

5 000 Feet

Scale 1:15 840

1 0 1 000 2 000 3 000 4 000 5 000

SPOTSYLVANIA COUNTY, VIRGINIA NO. 8

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 9

9

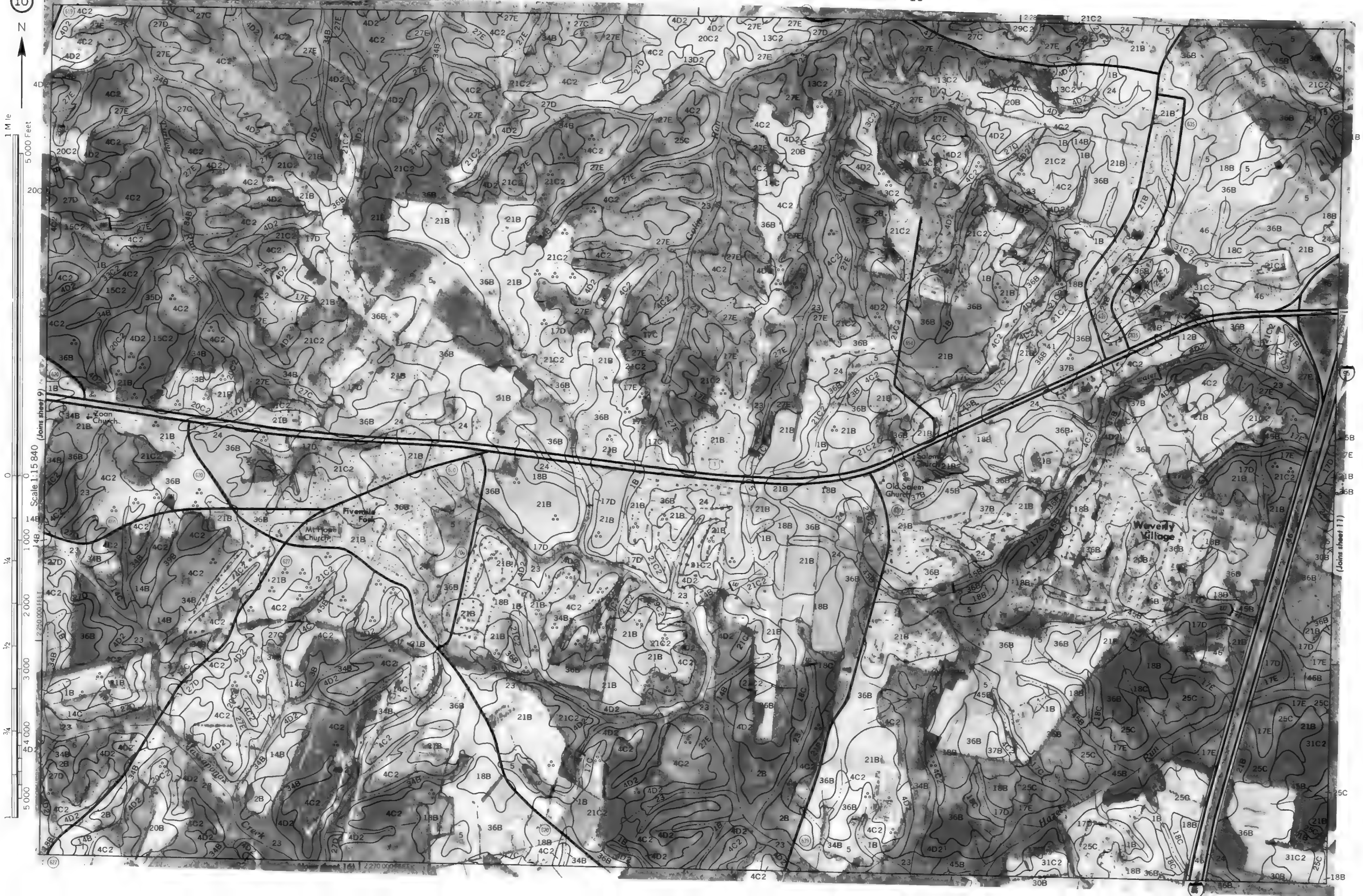
N

1 Mi

5 000 Feet

Scale 1:15 840

SPOTSYLVANIA COUNTY, VIRGINIA NO. 9


N
Scale 1:15 840
1 Mile
5 000 Feet
(Joins sheet 9)
(Joins sheet 11)
Zoan Church
Fivemile Fork
Mt Hope Church
Salem Church
Old Salem Church
Waverly Village
Massaponax Creek
Hazel Run
Colin Run

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 11

SPOTSYLVANIA COUNTY, VIRGINIA NO. 11

11

N

1 Mile

5 000 Feet

Scale 1:15 840

0 0

¼ 1 000

½ 2 000

¾ 3 000

1 4 000

5 000

2 285 000 FEET

(Joins sheet 6)

CITY OF FREDERICKSBURG

Hazel Run

Rappahannock River

STAFFORD COUNTY

water

Sylvania Heights

2 300 000 FEET

(Joins sheet 17)

N

1 Mile

5 000 Feet

0

Scale 1:15 840

1/4 1 000

1/2 2 000

3/4 3 000

1 4 000

5 000

2 200 000 FEET

(Joins sheet 11)

(Joins sheet 13)

(Joins sheet 19)

2 190 000 FEET

COUNTY

ORANGE

Shenly

Bridge

water

McCracken

Creek

SPOTSYLVANIA COUNTY, VIRGINIA NO. 12

SPOTSYLVANIA COUNTY, VIRGINIA NO. 13

14

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

Fawn Lake

Pilfer Creek

Greenfield Creek

Catlett Branch

Piney Branch

Todds Tavern

(Joins sheet 8)

(Joins sheet 13)

(Joins sheet 15)

(Joins sheet 9)

SPOTSYLVANIA COUNTY, VIRGINIA NO. 14

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 15

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

N

15

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 16

16

N

Scale 1:15 840

1 Mile

5 000 Feet

SPOTSYLVANIA COUNTY, VIRGINIA NO. 16

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 17

17

N

Scale 1:15 840

1 Mile

5 000 Feet

SPOTSYLVANIA COUNTY, VIRGINIA NO. 17

18

N

(Joins inset, 6)

2 320 000 FEET

220 000 FEET

214 000 FEET

2 325 000 FEET

2 324 000 FEET

1000 AND 4000 FOOT GRID TICKS

(Joins lower right)

STAFFORD COUNTY

CAROLINE COUNTY

STAFFORD COUNTY

Ruffins Pond

water

(Joins sheet 17)

(Joins sheet 25)

2 305 000 FEET

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

Prepared by Soil Conservation Service, U.S. Department of Agriculture, in cooperation with Virginia Polytechnic Institute and State University, Agricultural Experiment Station, and Virginia Department of Conservation and Economic Development, Division of Soil and Water Conservation

SPOTSYLVANIA COUNTY, VIRGINIA NO. 18

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 19

19

N

1 Mile

5 000 Feet

Scale 1:15 840

SPOTSYLVANIA COUNTY, VIRGINIA NO. 19

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 20

20

N

1 Mile

5 000 Feet

Scale 1:15 840

(Joins sheet 13)

2225 000 FEET

(Joins sheet 21)

(Joins sheet 28)

2210 000 FEET

Robertson Run

Robertson Run

Logan

Culpeper

Culpeper

RIVER

PO

Shady Grove Church

SPOTSYLVANIA COUNTY, VIRGINIA NO. 20

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 21

21

N

1 Mile

5 000 Feet

Scale 1:15 840

SPOTSYLVANIA COUNTY, VIRGINIA NO. 21

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 22

22

N

Scale 1:15 840

1 Mile 5 000 Feet

1 250 000 FEET

SPOTSYLVANIA COUNTY, VIRGINIA NO. 22

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 23

23

N

Massaponax Creek

Po River

Ni River

Fraziers Gate

(Joins sheet 22)

(Joins sheet 31)

1 Mile 5 000 Feet

Scale 1:15 840

SPOTSYLVANIA COUNTY, VIRGINIA NO. 23

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 24

(24)

N

1 Mile

5 000 Feet

Scale 1:15 840

Massaponax Creek

Second New Hope Church

FREDERICKSBURG AND

(Joins sheet 17)

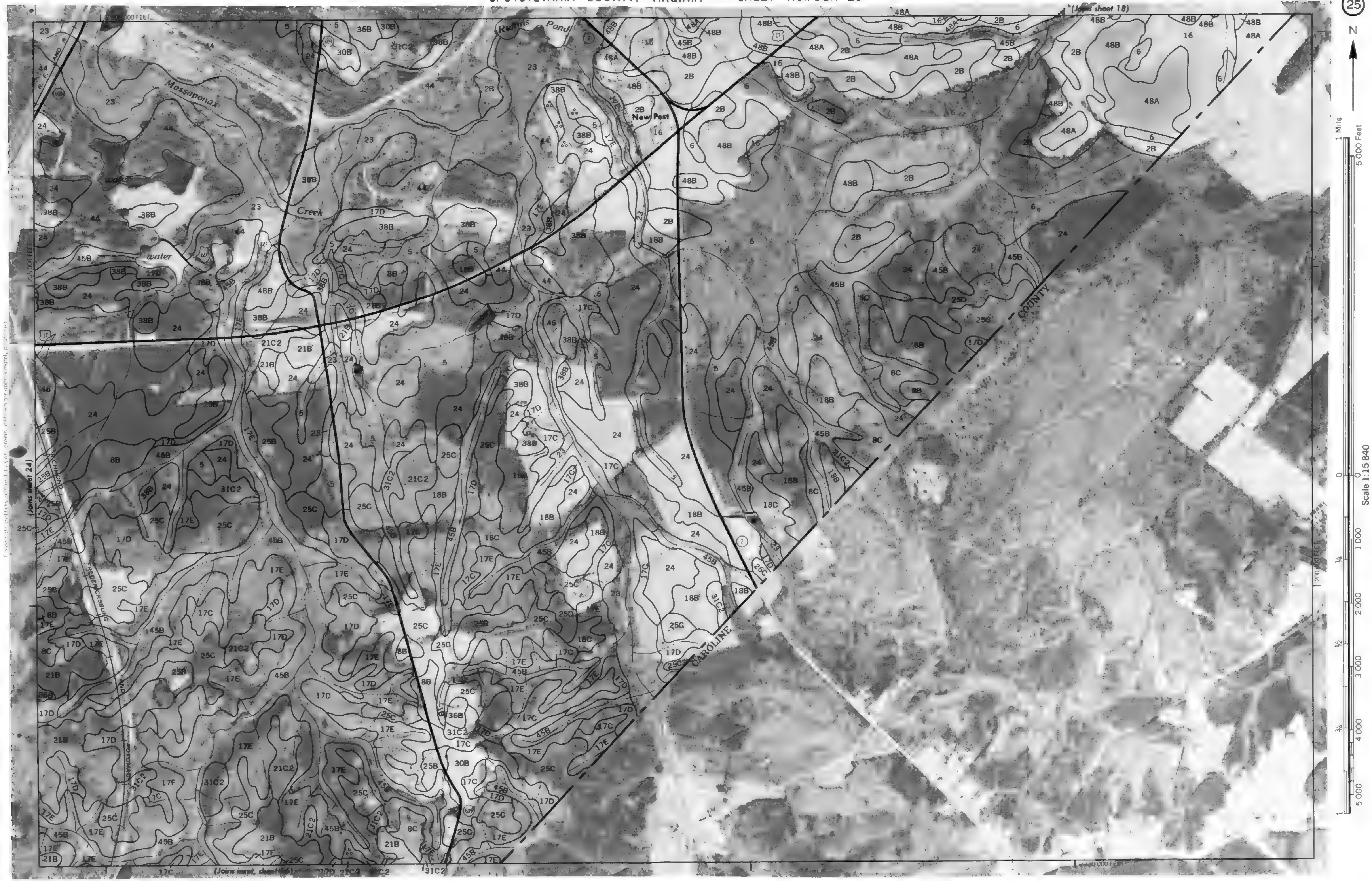
(Joins sheet 23)

(Joins sheet 31)

2 300 000 FEET

2 285 000 FEET

SPOTSYLVANIA COUNTY, VIRGINIA NO. 24



SPOTSYLVANIA COUNTY, VIRGINIA NO. 25

26

N

1 Mile

5,000 Feet

Scale 1:15 840

3000 AND 4000 FOOT GRID TICKS

SPOTSYLVANIA COUNTY, VIRGINIA NO. 26

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 27

27

N

1 Mile

5 000 Feet

Scale 1:15 840

1 0 1/4 1/2 3/4 1

5 000 4 000 3 000 2 000 1 000 0

SPOTSYLVANIA COUNTY, VIRGINIA NO. 27

Porters

Plentiful

True Light Church

(Joins sheet 26)

(Joins sheet 28)

(Joins sheet 34)

2 190 000 FEET

2 205 000 FEET

28

N

1 Mile

5 000 Feet

Scale 1:15 840

2,225 000 FEET

1,000 FEET

Joins sheet 27

Joins sheet 29

Joins sheet 35

Martins Corner

Panier

Pond

Pond

Glady Run

Glady Run

Glady Run

SPOTSYLVANIA COUNTY, VIRGINIA NO. 28

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 29

29

N

1 Mile

5 000 Feet

Scale 1:15 840

SPOTSYLVANIA COUNTY, VIRGINIA NO. 29

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 30

30

N

Scale 1:15 840

1 Mile

5 000 Feet

SPOTSYLVANIA
(county seat)

High School

Robert E. Lee School

Po River

(Joins sheet 22)

(Joins sheet 29)

(Joins sheet 31)

(Joins sheet 37)

2 250 000 FEET

1 195 000 FEET

SPOTSYLVANIA COUNTY, VIRGINIA NO. 30

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 31

SPOTSYLVANIA COUNTY, VIRGINIA NO. 31

31

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

Smiths Mill

River

(Joins sheet 30)

(Joins sheet 32)

(Joins sheet 33)

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 32

32

N

Scale 1:15 840

1 Mile 5 000 Feet

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

(Joins sheet 24)

(Joins sheet 31)

(Joins inset, sheet 56)

(Joins sheet 39)

2 285 000 FEET

185 000 FEET

Massaponax

Bethlehem Church

FREDERICKSBURG

POTOMAC

RICHMOND

COUNTY

CAROLINE

SPOTSYLVANIA COUNTY, VIRGINIA NO. 32

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 33

33

SPOTSYLVANIA COUNTY, VIRGINIA NO. 33

N

1 Mile

5 000 Feet

Scale 1:15 840

(Joins sheet 40)

(Joins sheet 41)

2 170 000 FEET

2 185 000 FEET

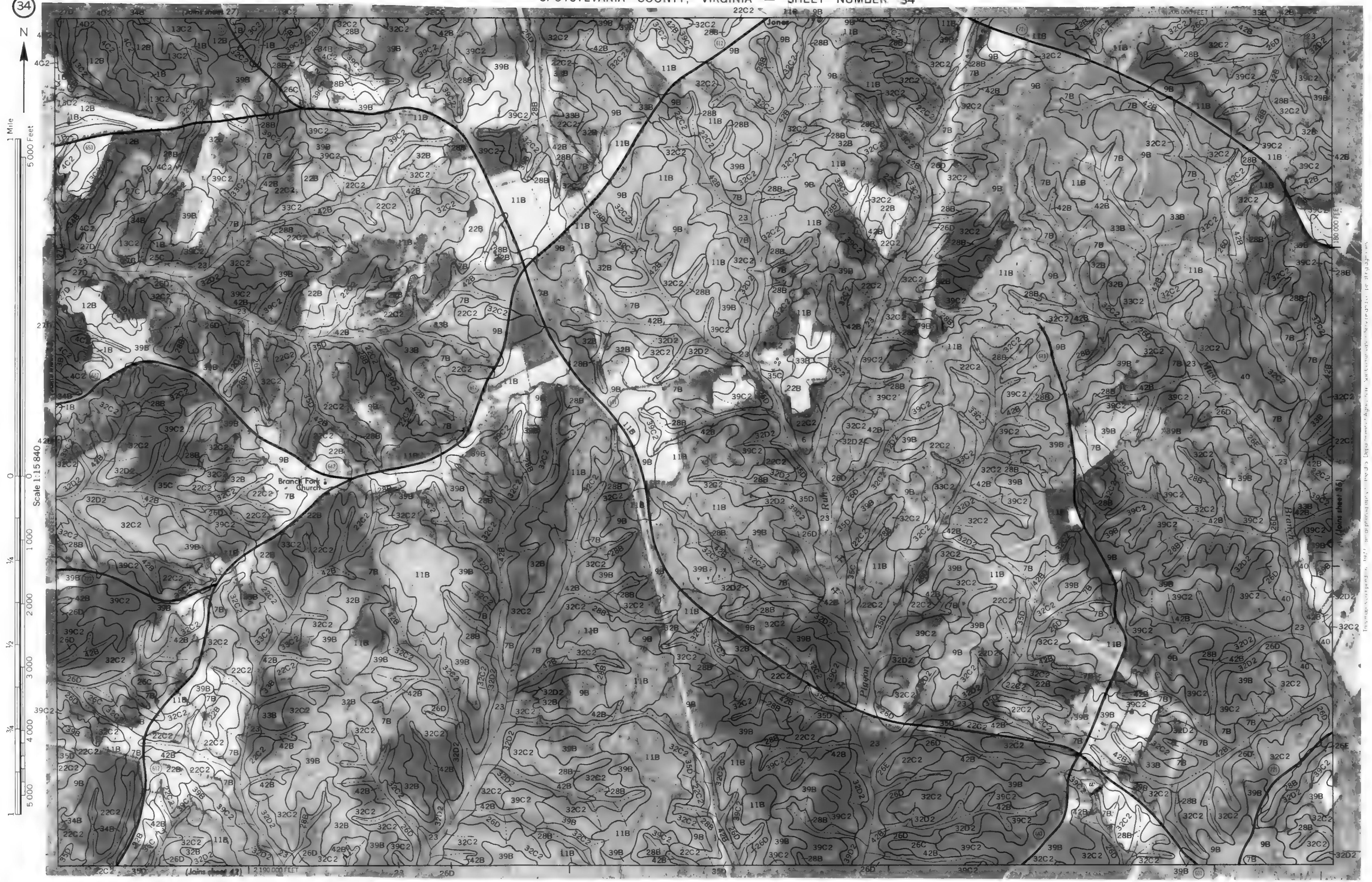
180 000 FEET

ORANGE COUNTY

LAKE ANNA

Belmont

Dam



SPOTSYLVANIA COUNTY, VIRGINIA NO. 34

N

Scale 1:15 840

1 Mile

5 000 Feet

Knights Branch

Music Branch

Lanes Corner

Little Mine Road Church

Mine Road Church

Mergo

Brokenburg

(Joins sheet 34)

(Joins sheet 36)

(Joins sheet 43)

2 225 000 FEET

SPOTSYLVANIA COUNTY, VIRGINIA NO. 35

36

N

1 Mile

5 000 Feet

Scale 1:15 840

1/4 0 1/4

1/2 1 000 1/2

3/4 2 000 3/4

1 3 000 1

4 000

5 000

1 125 000 FEET

2 230 000 FEET

(Joins sheet 35)

(Joins sheet 37)

(Joins sheet 44)

Hebron Church

Black water

Rock Run

Toules Pond

Ta River

SPOTSYLVANIA COUNTY, VIRGINIA NO. 36

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 37

37

N

1 Mile

5 000 Feet

Scale 1:15 840

0 0 1/4 1/2 3/4 1

1 000 2 000 3 000 4 000 5 000

(Joins sheet 30)

(Joins sheet 36)

(Joins sheet 45)

2 250 000 FEET

1 260 000 FEET

2 265 000 FEET

Wright School

Travelers Rest Church

Snell

water

Run

River

Bluff

SPOTSYLVANIA COUNTY, VIRGINIA NO. 37

Soil survey data published by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 38

38

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

Old Trap

Standards Mill

Thornburg

water

River

(Joins sheet 37)

(Joins sheet 39)

(Joins sheet 46)

2 280 000 FEET

2 265 000 FEET

SPOTSYLVANIA COUNTY, VIRGINIA NO. 38

N

1 Mile

5 000 Feet

Scale 1:15 840

2 285 000 FEET

2 300 000 FEET

175 000 FEET

170 000 FEET

(Joins sheet 38)

(Joins inset, upper right)

(Joins lower left) 25B

(Joins sheet 46)

Ni River

Po River

COUNTY

CAROLINE COUNTY

SPOTSYLVANIA COUNTY, VIRGINIA NO. 39

Topography compiled 1937, aerial photography by the U. S. Department of Agriculture Soil Conservation Service and cooperating agencies

40

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

2 165 000 FEET

2 150 000 FEET

ORANGE COUNTY

LOUISA COUNTY

ANNA

LAKE

(Joins sheet 33)

(Joins upper right)

(Joins sheet 41)

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 41

41

N

1 Mile

5 000 Feet

Scale 1:15 840

SPOTSYLVANIA COUNTY, VIRGINIA NO. 41

*This map is compiled on 1977 aerial photography by the U. S. Department of Agriculture Soil Conservation Service and cooperating agencies

Control over grid lines and digit corners, if shown, are approximately positioned

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 42

42

N

1 Mile

5 000 Feet

Scale 1:15 840

1 0 1 0

¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

150 FOOT DEED

(Joins sheet 34)

(Joins sheet 43)

(Joins sheet 47)

2 190 FEET

7 905 000 FEET

LAKE

ANNA

LAKE

ANNA

water

Pigeon Run

Douglas Creek

LOUISA COUNTY

SPOTSYLVANIA COUNTY, VIRGINIA NO. 42

N

1 Mile

5 000 Feet

Scale 1:15 840

1 0 1 000 2 000 3 000 4 000 5 000

SPOTSYLVANIA COUNTY, VIRGINIA NO. 43

Good Hope Church

Bethel Church

Zoar Church

Water

Creek

Northeast

Southwest

(Joins sheet 42)

(Joins sheet 48)

2 270 000 FEET

2 225 000 FEET

170 000 FEET

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 44

(44)

N

1 Mile

5 000 Feet

0

Scale 1:15 840

1/4 1 000

1/2 2 000

3/4 3 000

1 4 000

5 000

Bluff Run

Mount Pleasant

Dawson Store

Run

River

(Joins sheet 30)

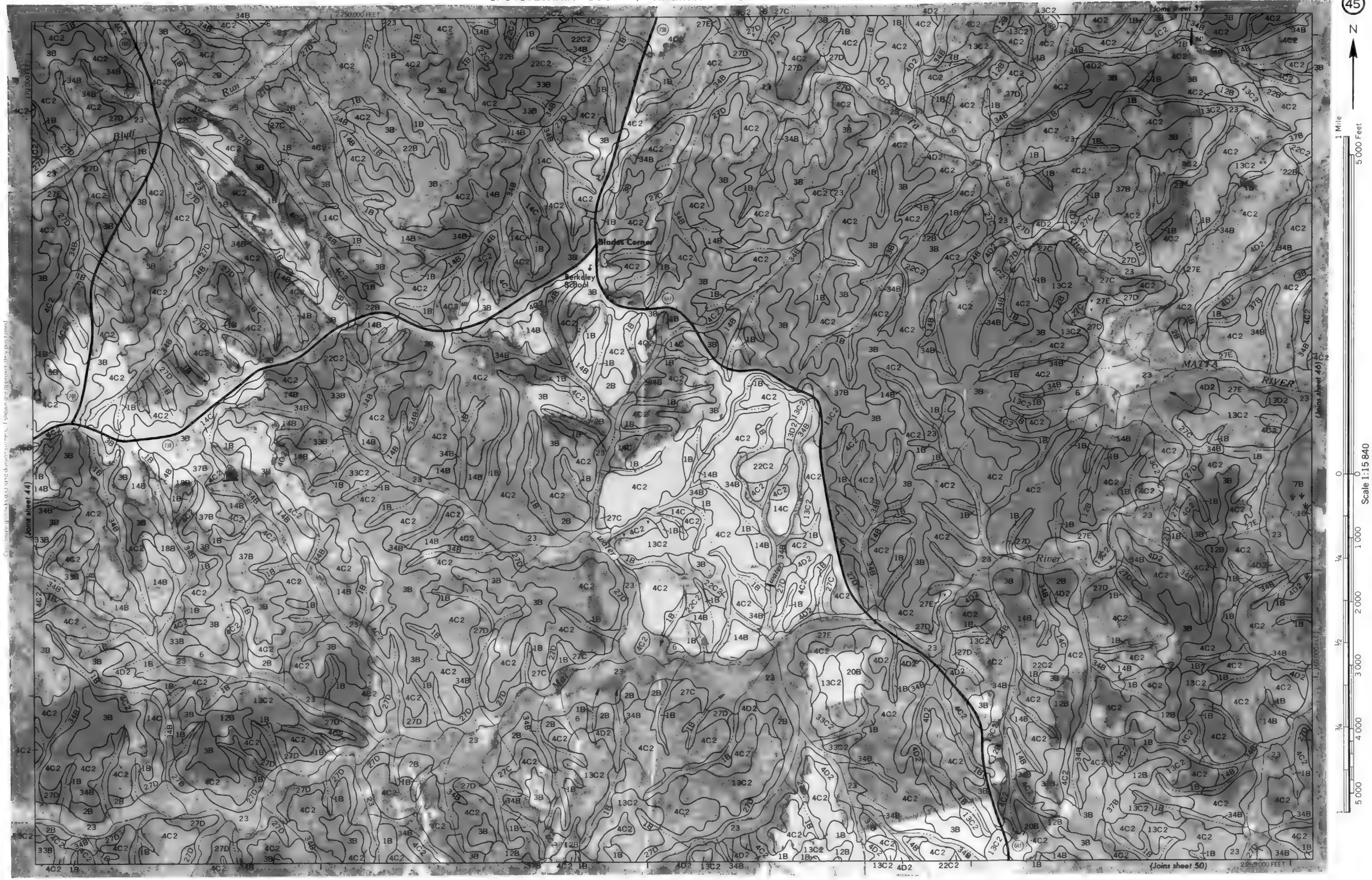
(Joins sheet 49)

(Joins sheet 45)

2 230 000 FEET

2 224 000 FEET

SPOTSYLVANIA COUNTY, VIRGINIA NO. 44



SPOTSYLVANIA COUNTY, VIRGINIA NO. 45

This map is compiled on 1977 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.

46

N

(Joins sheet 38)

(Joins inset, sheet 39)

(Joins sheet 45)

Hemi Ford

MATTA RIVER

Colemans Mill

Arcadia

Beulah Church

CAROLINE COUNTY

1 Mile

5 000 Feet

Scale 1:15 840

SPOTSYLVANIA COUNTY, VIRGINIA NO. 46

SPOTSYLVANIA COUNTY, VIRGINIA NO. 47

This map is compiled on 1977 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies

Coordinate grid ticks and 1 x 1 inch corners, if shown are approximately positioned

48

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

(Joins sheet 43)

(Joins sheet 47)

(Joins sheet 49)

(Joins sheet 52)

2 210 000 FEET

2 225 000 FEET

LAKE ANNA

Stony Run

Northeast Creek

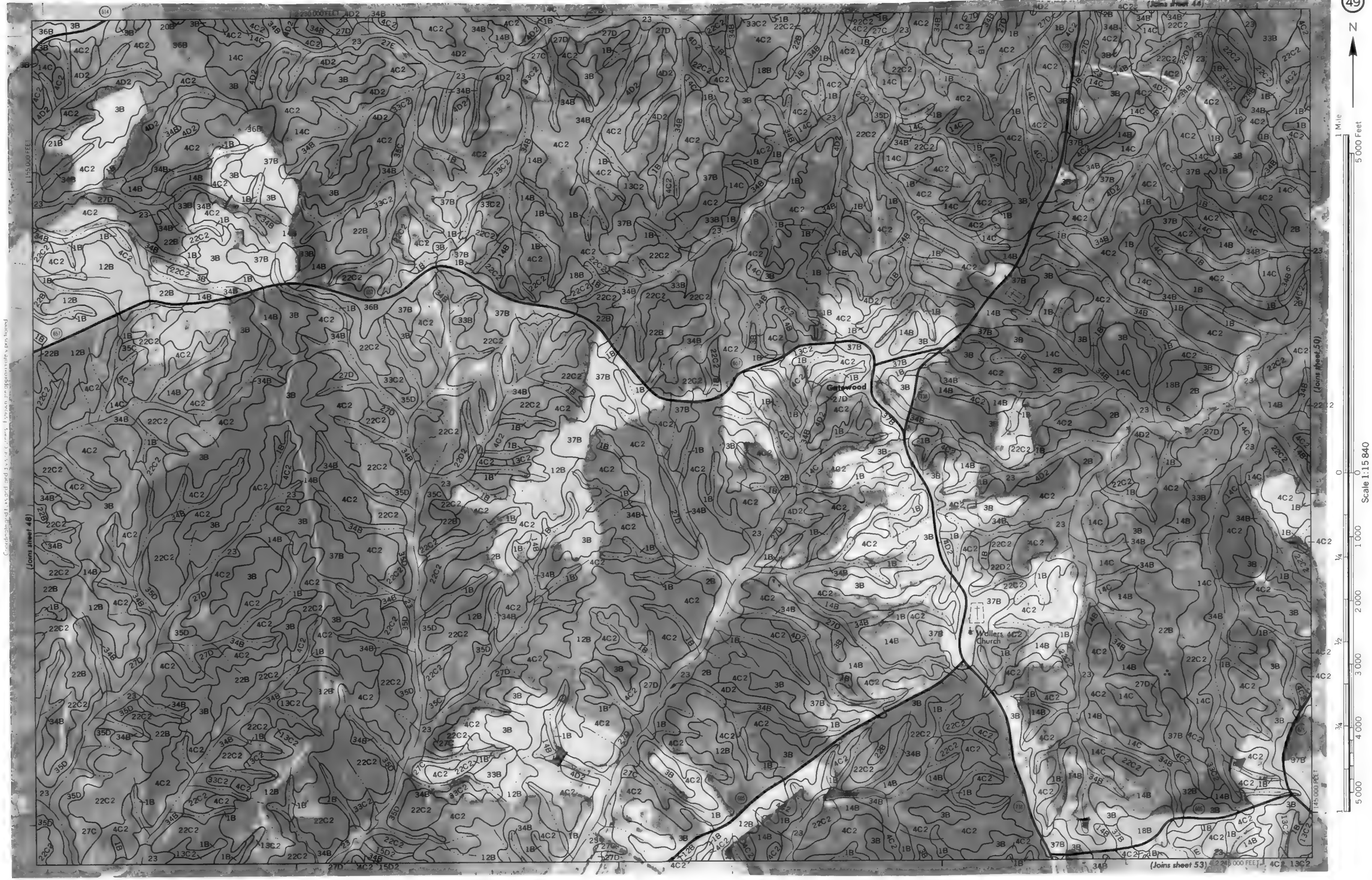
New Hope Church

St Johns Church

Lewiston

Louisa Co.

SPOTSYLVANIA COUNTY, VIRGINIA NO. 48



SPOTSYLVANIA COUNTY, VIRGINIA NO. 49

This map is compiled on 1977 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 50

50

N

Scale 1:15 840

1 Mile

5 000 Feet

1 000 Feet

(Joins sheet 45)

(Joins sheet 49)

(Joins sheet 51)

Mayre

SPOTSYLVANIA COUNTY, VIRGINIA NO. 50

SOIL SURVEY OF SPOTSYLVANIA COUNTY, VIRGINIA NO. 51

This survey was made in 1977 from aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately plotted.

51

N

1 Mile

5 000 Feet

Scale 1:15 840

1/4 0 1/4 1/2 3/4 1 0

1 000 0 1 000 2 000 3 000 4 000 5 000

(Joins sheet 46)

(Joins sheet 7)

(Joins inset, sheet 54)

Wilderness

ORANGE COUNTY

CAROLINE

SPOTSYLVANIA COUNTY, VIRGINIA — SHEET NUMBER 52

52

N

1 Mile

5 000 Feet

Scale 1:15 840

1 000 0 1 000 2 000 3 000 4 000 5 000

1/4 1/2 3/4 1

(Joins sheet 48)

2 225 000 FEET

LAKE LOUISA

ANNA

COUNTY

LAKE LOUISA

ANNA

COUNTY

(Joins sheet 53)

(Joins lower right)

(Joins sheet 55)

2 210 000 FEET

1000 AND 3000 FOOT GRID TICKS

SPOTSYLVANIA COUNTY, VIRGINIA NO. 52

N

(Joins sheet 49)

(Joins sheet 52)

(Joins sheet 54)

(Joins sheet 55)

Chewings Corner

Northeast

Levy

Scale 1:15 840

1 Mile

5 000 Feet

SPOTSYLVANIA COUNTY, VIRGINIA NO. 53

This map is compiled on 1977 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.

Coordinate grid ticks and land division corners, if shown are approximately positioned.

54

N

1 Mile

5 000 Feet

Scale 1:15 840

(Joins sheet 50)

(Joins sheet 53)

(Joins sheet 56)

(Joins sheet lower right)

2 250 000 FEET

1 140 000 FEET

Partlow

CAROLINE COUNTY

water

2000 AND 3000-FOOT GRID TICKS

(Joins sheet 51)

2 268 000 FEET

(Joins upper right)

142 000 FEET

144 000 FEET

2 255 000 FEET

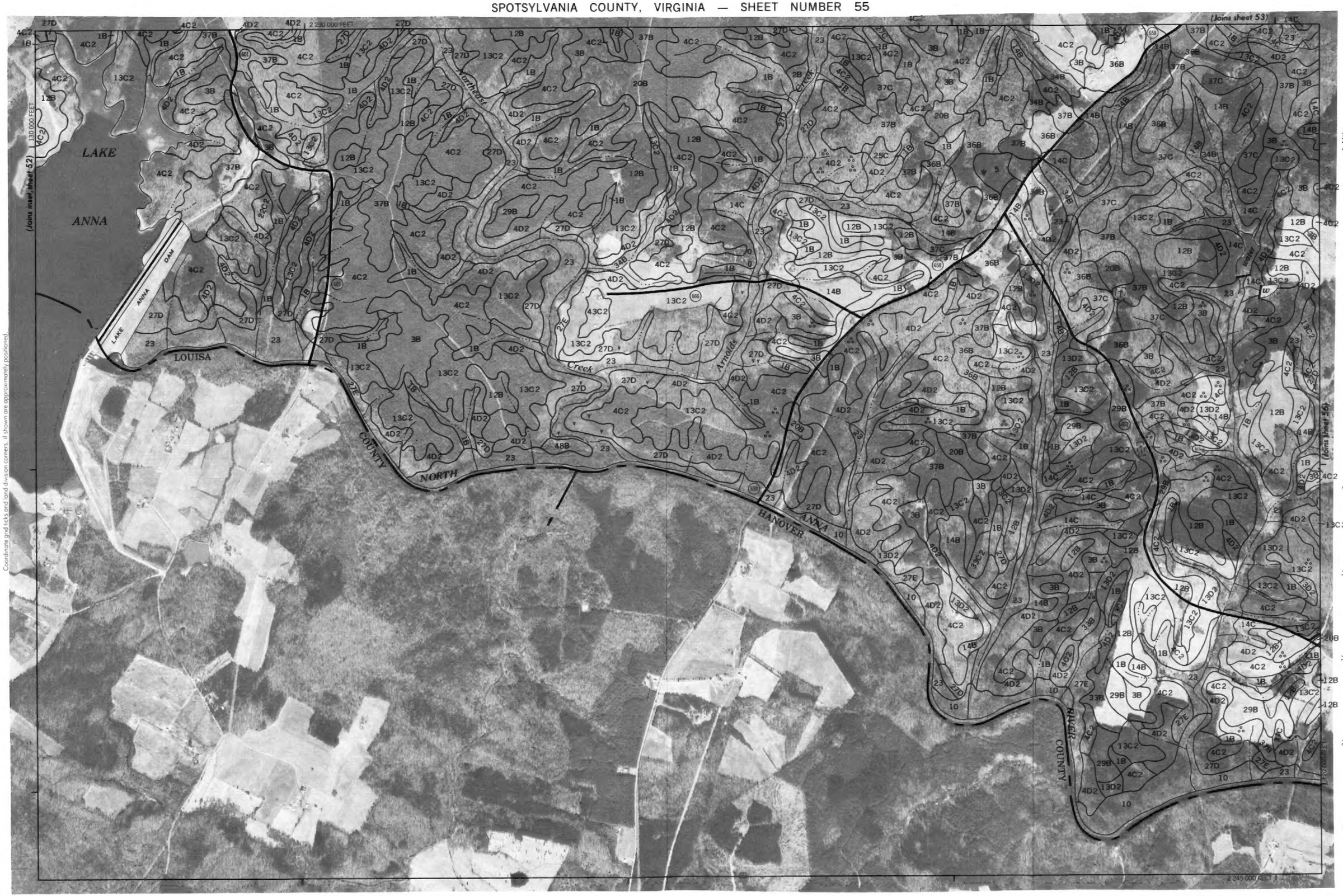
This map is compiled on 1977 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.

Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SPOTSYLVANIA COUNTY, VIRGINIA NO. 54

SPOTSYLVANIA COUNTY, VIRGINIA NO. 55

This map is compiled on 1977 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.



56

N

1 Mile
5 000 Feet

Scale 1:15 840

(Joins sheet 54)

(Joins sheet 55)

(Joins sheet 25)

(Joins sheet 32)

2 255 000 FEET

2 250 000 FEET

2 310 000 FEET

2 305 000 FEET

195 000 FEET

190 000 FEET

COUNTY

CAROLINE

HANOVER COUNTY

NO. ANNA RIVER

water

This map is compiled on 1977 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SPOTSYLVANIA COUNTY, VIRGINIA NO. 56